AMERICAN AGRICULTURIST

FOR THE

Farm, Garden, and Household.

"AGRICULTURE IS THE MOST HEALTHFUL, MOST USEFUL, AND MOST NOBLE EMPLOYMENT OF MAN."—Washington.

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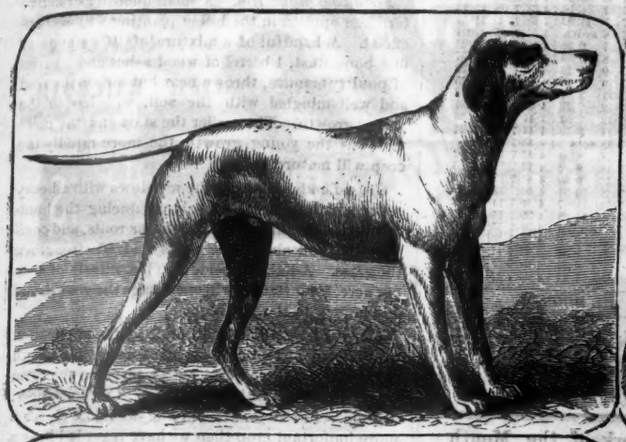

MR. WILLARD'S POINTER, "SEFTON."
MR. GILSON'S NEWFOUNDLAND DOG, "MAJOR."
MR. LAWLER'S IRISH WATER SPANIEL, "MACK."

MR. WATTS' COLLIE, "RAY."—YORKSHIRE TERRIER, "CHARLIE."
MR. SMITH'S RUSSIAN SETTER, "CZAR."—JAPANESE SPANIEL, "PRINNIE."
MR. VON LENGERKE'S NATIVE SETTER, "JERSEY DUKE."

PRIZE DOGS AT THE NEW YORK BENCH SHOW, HELD APRIL 8, 9, 10, & 11, 1879.—(*See page* 178.)

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Bees-Wax.—"J. S.," Pa. Wax is a secretion of the bee. If you examine bees at the time they are building comb, you will see beneath the rings on the under side of the abdomen of the bees minute scales of wax. In view of the large consumption of honey required to produce wax, bee-keepers aid the bees by supplying them with "Comb Foundation." This, which is one of the great inventions of modern bee-keeping, is described in this month's "Bee Notes."

Calendar for May, 1879.

Day of Month.	Day of Week.	Boston, N. England, N. York State, Michigan, Wisconsin, Iowa, and Oregon. Sun rises.	Sun sets.	Mo'n sets.	N. Y. City, Ct., Philadelphia, New Jersey, Penn., Ohio, Indiana, and Illinois. Sun rises.	Sun sets.	Mo'n sets.	Washington, Maryland, Virginia, Kentucky, Missouri, and California. Sun rises.	Sun sets.	Mo'n sets.
		H. M	H. M	H. M.	H. M	H. M	H. M.	H. M	H. M	H. M.
1	T	4 55	6 59	2 5	4 58	6 56	2 4	5 2	6 52	2 2
2	F	4 53	7 0	2 50	4 57	6 57	2 30	5 1	6 53	2 30
3	S	4 52	7 1	3 1	4 56	6 58	2 57	4 59	6 54	2 59
4	S	4 51	7 3	3 23	4 54	6 59	3 26	4 58	6 55	3 39
5	M	4 49	7 4	rises	4 53	7 0	rises	4 57	6 56	rises
6	T	4 48	7 5	8 14	4 52	7 1	8 8	4 56	6 57	8 2
7	W	4 47	7 6	9 29	4 51	7 2	9 22	4 55	6 58	9 16
8	T	4 46	7 7	10 32	4 50	7 3	10 26	4 54	6 59	10 20
9	F	4 45	7 8	11 23	4 49	7 4	11 18	4 53	7 0	11 12
10	S	4 43	7 9	morn	4 48	7 5	11 59	4 52	7 1	11 54
11	S	4 42	7 10	0 3	4 47	7 6	morn	4 51	7 2	morn
12	M	4 41	7 11	0 35	4 46	7 7	0 32	4 50	7 3	0 28
13	T	4 40	7 12	1 1	4 44	7 8	0 59	4 49	7 3	0 57
14	W	4 39	7 13	1 24	4 43	7 9	1 23	4 48	7 4	1 22
15	T	4 38	7 14	1 45	4 42	7 10	1 45	4 47	7 5	1 45
16	F	4 37	7 15	2 5	4 42	7 11	2 7	4 46	7 6	2 8
17	S	4 36	7 16	2 26	4 41	7 12	2 29	4 45	7 7	2 31
18	S	4 35	7 17	2 49	4 40	7 13	2 52	4 44	7 8	2 56
19	M	4 34	7 18	3 15	4 39	7 14	3 19	4 44	7 9	3 24
20	T	4 33	7 19	sets	4 38	7 15	sets	4 43	7 10	sets
21	W	4 33	7 20	8 14	4 37	7 16	8 8	4 42	7 11	8 2
22	T	4 32	7 21	9 8	4 37	7 16	9 2	4 42	7 11	8 55
23	F	4 31	7 22	9 56	4 36	7 17	9 50	4 41	7 12	9 44
24	S	4 30	7 23	10 37	4 35	7 18	10 31	4 40	7 13	10 26
25	S	4 29	7 24	11 11	4 35	7 19	11 7	4 40	7 14	11 3
26	M	4 28	7 25	11 41	4 34	7 20	11 38	4 39	7 15	11 35
27	T	4 28	7 26	morn	4 33	7 21	morn	4 38	7 15	morn
28	W	4 27	7 27	0 6	4 33	7 21	0 6	4 38	7 16	0 3
29	T	4 27	7 27	0 31	4 32	7 22	0 31	4 37	7 17	0 31
30	F	4 26	7 28	0 56	4 32	7 23	0 57	4 37	7 18	0 58
31	S	4 26	7 29	1 22	4 31	7 24	1 24	4 37	7 18	1 26

PHASES OF THE MOON.

MOON.	D.	BOSTON. H. M.	N. YORK. H. M.	WASH'N. H. M.	CHA'STON H. M.	CHICAGO. H. M.
Full M'n	6	1 28 mo.	1 16 mo.	1 4 mo	0 52 mo.	0 22 mo.
3d Quart.	12	9 52 ev.	9 40 ev.	9 28 ev.	9 16 ev.	8 46 ev.
New M'n	21	1 6 mo.	0 54 mo.	0 42 mo	0 30 mo.	0 1 mo.
1st Quart	28	6 52 ev.	6 40 ev.	6 28 ev.	6 16 ev.	5 46 ev.

Hints for the Work of the Month.

[*The Hints and Suggestions in these columns are never copied from previous years, but are freshly prepared for every month, from the latest experience and observations, by practical men in each department.*]

The Corn Crop, furnishes in May the chief employment of the northern and western farmers. Planting earlier than the first week in this month is scarcely advisable, as a late frost may render it necessary to repeat the work. It is safer to leave the planting until the ground is warm and the weather settled. A crop planted in April, may be in June considerably behind one planted two weeks later.—Several articles on corn will be found in this paper.

Replanting.—There is always more or less replanting of corn to be done, because of loss by cut worms, crows, and weak plants. It is well to have a bed made in a warm sheltered place, which may be planted thickly at the same time as the main crop, to provide plants to replace those lost. The vacancies in the field may be filled from this bed by transplanting on a rainy day, or when the ground is wet after a warm rain. It is not generally known that corn may be successfully transplanted.

Plowing for Corn.—It is a question whether we could not advantageously let our grass lands remain, rather than plow them up for the corn crop. "A sod for corn," has been the rule hitherto, but circumstances beyond our control, are forcing new conditions upon us. One of these is the necessity for producing more meat, milk, cheese and butter, and less grain than formerly, and for these we need grass or other green crops. Corn is a grand crop and our climate suits it, but the best corn we can grow is not so profitable as roots. Our practice must change as the times change, and it seems probable that we can no longer sacrifice an excellent sod for the corn crop.

Corn on Stubble.—A general western practice is to plant corn on stubble land. The increasing use of artificial fertilizers, has shown that we may often ignore rotations, and repeat the same crops when we desire to do so. English farmers are depending less upon "rotation," and our farmers are losing faith in the necessity for it. Experience is showing that we can supply the soil with the elements needed to grow any crop whatever, without regard to its previous condition; and that as good and profitable a crop of corn may be grown upon stubble as upon a sod. The articles in the *American Agriculturist* for April, page 127-'8-'9, may be profitably studied with reference to this.

Hills or Drills.—It has been proved that by planting in drills, a larger yield of corn can be produced than from hills. In place of hills 3 ft. apart each way, make drills 3½ feet apart, and drop the seed every 18 inches. In the first case there are 4,840 hills and in the latter 8,400 to the acre. Two stalks may be grown in each hill, or if there are 3 stalks in the former case, there will be 14,520 stalks, and 16,800 in the latter, with one good ear to a stalk—which is possible—there will be 145 bushels in the one case, and 168 in the other to the acre. If this is possible, and there is no doubt of it, why should it not be attempted?

Fertilizing in the Hill.—A small quantity of active fertilizer applied in the hill at planting will be beneficial. A handful of a mixture of 100 pounds of fine bone dust, 1 barrel of wood ashes and 1 barrel of poultry manure, thrown near but not on the seed and well mingled with the soil, will hasten the young growth. The earlier the start and the more vigorous the young growth, the more rapidly the crop will mature.

Grass Lands.—Rolling the meadows with a heavy roller will level the surface by reducing the hummocks, sinking stones and sticks, or roots, and compact the soil about the roots and so strengthen the grass. A light dressing, 100 lbs. nitrate of soda, per acre, for instance, will encourage the growth and add largely to the yield.

Clover Fields will be benefited by the application of a bushel or two of plaster, as early this month as possible. There is no better place on the farm to put wood ashes than on clover. Circumstances, already referred to, are tending to make clover a more important crop than we have regarded it, as a preparation for wheat and for green feeding. For this use some of the annual varieties may be sown.

Roots are the most valuable product we can grow. One acre of mangels or beets may be made to feed 2 or 3 cows for a whole year. This is more than can be done from an acre of any other farm product. To grow mangels successfully, they should be sown this month, before the 20th if possible. After mangels, come sugar beets and blood beets, which may be sown early in June, but are better sown in May. There are several varieties of yellow-fleshed mangels, which are thought more valuable than the red varieties. Webb's Yellow Globe, the Yellow-fleshed Tankard, the Long Yellow, and some other varieties of this color, are already introduced here, and are found to succeed well. They are more solid than the large red varieties.

Fodder Crops.—After the April-sown fodder crops, will come the early kinds of Sweet Corn to be cut in June and July, after the clover has been fed off, as a change, or to follow early-sown oats. During May, winter rye will be cut and fed, and meanwhile a portion of the clover should be pushed ahead to follow the rye. Some early varieties of Cabbages, of which the writer finds Fottler's Early Drumhead the best for this purpose on his soil, should be planted out as soon as possible for the cows. A head of this variety, weighing 20 lbs. is a good mid-day lunch for a cow when the grass is failing. As the fodder rye is cut off, in strips through the field, the ground may be plowed and re-sown immediately with Sweet Corn, a second sowing of Oats, or set with Cabbages.

Insect Pests.—No quarter should be given to the insect pests which remain year after year simply because we permit them. The Potato Beetle exists so plentifully, because some careless farmers actually breed myriads of them. Many fields of potatoes were abandoned to them last year, and the neighboring country was thus stocked for this year. This is one insect that might be abolished by a combined effort for a year or two. Another is the cattle Gad-fly, which may be found now in the backs of the cows and oxen in small lumps or tumors, called warbles. The grubs may be squeezed out of these tumors through the breathing holes, and destroyed. Otherwise they will escape, change to flies, and continue the mischief.

Horses.—A moderate quantity of green rye will be very acceptable to the horses. It will have a healthful effect, and will cool the system as well as

a dose of medicine. Where there are no stones in the fields, the shoes may be removed from the plow teams for a time, with benefit. Hurry up the work during this month, so that as the mid-day heat increases next month, some leisure may be taken.

Oxen as beasts of draft are in some places better than horses. They require different treatment from horses, and especially in the spring, when warm weather opens. Sufficient time should be given for them to feed, and being slow of motion, they should be driven accordingly. In working small farms, oxen will be found more economical than horses, and a pair may be useful on a large farm.

Cows.—Now that the cows are fully on the pastures, supply them regularly with salt. One ounce a day is sufficient, and it will prevent possible injurious effect of the fresh succulent food which otherwise might appear in the form of severe and dangerous disorders of the blood. A noon feed of hay with a quart of cotton-seed meal will be useful this month, until the grass becomes less succulent.

Calves.—The thriftiest calves should be closely watched when turned to pasture, lest they be attacked with "black quarter." This is the effect of too rank and watery food which impairs digestion. An ounce of Epsom salts may be given with advantage to each calf when turned out, as a precaution against this frequent danger.

A Change of Food is to be made cautiously. The stomach and bowels are easily disordered by the sudden and serious change made at this season, and during the first month the substitution of grass or clover for dry food should be gradual. The first symptoms of anything wrong in cows, is a shrinking of the milk, or a loss of appetite.

Sheep and Lambs.—Ewes from which lambs have been taken, should be relieved of some of their milk if their udders are full. The flock should be counted twice a day, and carefully examined for anything that may be amiss. Ewes to be fattened may be fed liberally.

Washing Sheep.—The practice of washing sheep before shearing is very disagreeable, and is unnecessary. Nothing is gained in the price of the wool—in fact, the usual deduction made by wool buyers for unwashed wool leaves an advantage with the seller. The practice is dangerous to health of both men and sheep, and may well be abolished.

Dipping the Lambs.—When the sheep are shorn, the ticks gather on the lambs, and these pests may be destroyed by dipping. Buchan's Cresylic Sheep Dip is a safe and effective preparation for destroying all outward parasites of the sheep, and the Cresylic Ointment is useful to cure accidental cuts made in shearing, and to prevent damage by flies on wounds.

Poultry.—Young chicks will thrive best when they are kept dry and clean, and moved frequently to fresh ground. There is no better place for a coop than the garden through which the chicks will wander freely, picking up or driving off many insects. A bed of young cabbages may be kept clear of flea-beetles, and other crops may be preserved in a similar manner, by a few broods of chicks: Provide an abundance of clean water, tight shelter overhead and a dry floor. There will rarely be gapes if this plan is followed.

Orchard and Garden Work.

Over a large part of the country the custom prevails of making the first of May "moving day," and those who come into new possessions, whether by purchase or by renting, do so at a time inconveniently late for garden and orchard operations. Still, this late beginning is not so disadvantageous as many suppose, especially if one has made his plans in view of it, and has so arranged matters that, when work does begin, he will lose no time in planning and such preliminary matters. One may even plant an orchard or fruit garden in May (this, of course, refers to the Northern States), if he has had the forethought to select and order the trees and plants, and had these heeled-in ready for planting. In the Kitchen Garden there is but little loss from late sowing; the majority of seeds give better results if the sowing is delayed until the ground is well warmed. Therefore, those who must, from necessity, begin their operations this month, need not be discouraged. In well-regulated nurseries, this late demand is provided for; the ordinary trees and shrubs are taken up early in the season, heeled-in, and thus kept dormant.

Orchard and Nursery.

The earliest work is provided for in the Notes for the last two months. Special attention is called to the directions given last month for the treatment of trees—and it applies as well to shrubs—that have been injured in transportation.

Grafting of old trees, while best done just as the buds upon the tree are swelling, may be continued, with proper care, until the trees are in bloom. In late grafting, the bark slips readily, and care is required in cutting off the branches to not make bad wounds. At this time, before sawing off a branch, cut around it with a knife quite through the bark to the wood, and let the saw follow this cut; this will avoid displacing the bark.

Buds upon the Stock should be left until it is seen that the graft is in union with it, which will be known by the growing of the buds on the graft, when those on the stock may be rubbed off.

Treatment of Grafts.—A cion inserted in an old tree is to be treated like a young tree planted in the ground, so far as shaping it goes. Sometimes a single bud will start and make a long wand-like shoot, without any side branches; this, if left to be whipped about by storms, may break the tender union between stock and cion. When a shoot of this kind is long enough, check it by pinching out the top, to induce it to form branches. So, when all the buds on a cion grow and make a crowded mass, remove a part, or check their growth by pinching.

Planting in Orchards.—No questions are more frequent than those that relate to crops in the orchard. There seems to be a reluctance to give up the soil to the trees. Those who do not care enough for an orchard to give the land to it, should not plant one. But there is a time, between the planting of the trees and their coming into bearing, when the soil may be planted with other crops to *the benefit of the trees*, and this should be the first consideration. When an orchard of any kind is properly planted, the trees, when full grown, need *all* the soil, and no crop should be taken from an established orchard. We use the term

No Crop taken from, for a crop may be grown in an orchard to its benefit, as when the ground is sown to clover or other crop, to be pastured by swine or sheep, and the roots ultimately plowed under; such cropping will constantly improve the land and benefit the trees. But no crop should be taken from the land in a bearing orchard.

Young Orchards.—The trees, at first, can occupy but a small share of the soil with their roots, and the spaces between them must be kept clear of weeds; this may be advantageously done by growing a crop at the same time, provided it is one that leaves the soil in as good condition as at first. In the great peach district, Indian corn is the general crop for young peach orchards. The rows of trees are twenty feet apart, and four rows of corn are put between each two rows of trees, allowing four feet between the rows, and the same distance between the trees and the rows of corn next to them. With the peach, a rapid grower, corn will answer, but

For Apple Orchards, the shade would be too great for thorough ripening, and lower growing crops, such as potatoes, squashes, melons, are preferable, especially as these, to be profitable, require a free use of manure and the thorough killing of weeds.

Insects will demand attention this month and every other month until vegetation ceases. Much of the success in fruit growing depends upon the close watching and proper combatting of these enemies. Only the leading pests can be mentioned.

Bark Lice.—These, especially the Oyster-shell Bark-louse, has much increased lately. If a tree from the nursery is infested, don't plant it, but charge it to the nurseryman. If an infested tree has been planted, pull it up and burn it and plant another. If an established tree shows this pest, paint it over, before the growth begins, with lard oil, or other cheap, not drying, oil. Several have used crude petroleum with success.

Canker Worms.—Barriers of tar or printer's ink upon bands of strong paper, put around the trunk, will keep the wingless female from ascending. Where the insects have reached the top, laid eggs, and the "worms" are already at work on the foliage, prevention is useless. Birds will destroy some. Some Western orchardists have found benefit from the use of Paris green—a tablespoonful to a pailful of water, syringed upon the foliage.

The Tent Caterpillar.—We have in time advised the destruction of the eggs. The caterpillars, when hatched, keep together and form a web or "tent." As soon as one of these is seen, destroy it in the morning or evening, when the insects are within. A hand, with or without a glove, to remove the tent, and a foot to crush the whole, are all the appliances needed.

Borers are not hatched within the tree. The eggs are laid on the bark, and the caterpillars then eat their way in. When within, their presence is shown by sawdust, by gum, by a depression in the bark, all near the root. When discovered, cut out with a knife or probe, or kill with a wire probe.

Curculio, especially destructive to the plum, and often so to the peach and other fruits, can *only* be treated by shaking off with a sudden jar, catching on a sheet or some substitute, and killing. If any one offers a curculio preventive, *try* before buying.

Plant Lice, often in crowds on the ends of cherry and other twigs, are easily killed by tobacco water.

Thin the Fruit.—Really choice fruit can only be had by thinning, and those who grow for market find that it pays. The sooner the thinning is done, after the fruit has fairly set, the better. In most seasons, one-half is too little to remove.

The Fruit Garden.

The earlier operations are hinted at in the Notes of the last two months. What has been said above, of late planting, applies also here.

Strawberries may still be planted, but as preparatory to next year's crop. It is not practicable to get a crop the same season the plants are set. If plants were not covered last fall, the sooner they are mulched the better. Clear up the beds, apply some good fertilizer along the rows, and give a good covering of straw, marsh hay, or other litter; this will both keep the soil moist, and preserve the fruit from contact with the earth.

Raspberries and Blackberries.—When new shoots start from the ground, allow only those to grow that are needed for next year's fruiting. Novices need to be reminded that next-year's fruit will be borne on stems that have grown this year, and that those which bear fruit this year will die.

Currants.—Watch for the eggs of the destructive caterpillar; these are laid on the underside of the lowermost leaves, and if destroyed before they hatch, much future trouble may be prevented. When the worms appear upon the leaves, White Hellebore is an efficient remedy. It may be dusted upon the bushes dry, or by stirring a tablespoonful in a pail of water, and applying with a syringe or garden pump. Two or three applications, at the intervals of a few days, will dispose of them.

Gooseberries are attacked by the same insect, and the same treatment should be given them. In most localities, gooseberries are more profitable when marketed green than if ripe. They should be full-grown, but not be at all soft or colored.

The White Grub, the larva of the "June or May or Dor-Bug," besides being very destructive elsewhere, often makes sad work with strawberries. Working under-ground, its presence is not known until the mischief is done. When a strawberry plant is found to wilt, take it up; its roots will be found to be eaten off, and it is past remedy. Search for the grub, and find it before it goes to another plant. They generally follow the row.

Grape Vines.—It is not too late to plant, if dormant vines can be had, and most dealers retard them by keeping a stock in a cool cellar. It costs

but little to plant a few vines, and the reward will be abundant in a few years. Newly planted vines, whether set last fall or this spring, whether they were one or two years old when planted, should, for the future good of the vine, be allowed to bear but *one single shoot* this year. Probably, when planted, it had two, three, or more buds; all these will start. Rub out all but two, and when the shoots from these two are long enough to tie to a stake, remove one and tie up the other. Two are allowed at first to guard against accidents.

Training Old Vines.—Recollect that all the buds now on the vine (or nearly all) will form shoots, and whatever fruit is to be borne will be on the few (three or four) lower joints of these. If there are so many buds that the shoots from them will be crowded, rub them off. Allow no more shoots to grow than can have abundant room to spread their leaves without crowding.

Layering the Grape.—If a cane of last year's growth is so situated that it can be brought to the ground and buried, layers can be easily made. Open a trench about six or eight inches deep, and peg such a cane along the bottom of it; when the buds start and make a few inches of growth, put a little earth in the trench, and as these shoots grow, pinch off their lower leaves, and gradually fill the trench. By next fall, each shoot will be well rooted, giving as many vines as there were shoots.

Marketing Fruit.—Have baskets and crates in readiness. For the styles of these, consult the dealer to whom the fruit is to be sent. The customs of the different markets vary greatly, and fruit in a package to which consumers are not accustomed, will appear at a disadvantage. Where a market is usually supplied with round baskets, do not introduce square ones, or *vice versa*. The further fruit is to be sent, the more the care required in shipping. An over-ripe berry may spoil a basket, and a spoiled basket hurt the sale of the crate.

Home Markets.—It is a mistake to suppose that large cities afford the only profitable markets. Those dealers who pass by flourishing towns and villages to get their fruit to New York, Philadelphia, etc., often make a mistake. As a general thing, small places are poorly supplied with fruit, often having only that which has been sent to the large centers, and from there distributed to them. It will pay to build up a market near home.

Kitchen and Market Garden.

What has been said on beginning late applies especially to the vegetable garden. A great many come into the possession of their garden plot only on the first of this month, and there are only a few early vegetables that are not as well sown now as earlier. The better condition of the soil, being now dry and warm, will compensate for the lack of early sowing and planting. Those who are obliged to begin their garden now, will find useful hints in previous months. The list of vegetables given in March, page 84, will be a help. Those who have already begun operations, should have in mind

Succession Crops, to follow the earliest sowings of peas, spinach, radishes, lettuce, etc.

Corn Planting Time.—In the Notes for March last, it was stated that the time at which corn could be safely planted, was a guide for each locality as to the proper time for sowing seeds of tender plants, or for setting out plants of this kind that had been raised under glass. Squashes, melons, and all related vines and other tender plants may be sown, and tomatoes may be set out whenever the farmers find it safe to put in their corn.

Small Gardens are often most easily furnished by buying certain plants, such as tomatoes, peppers, early cabbages. Where the number of plants required is small, it is easier to pay some one to supply the neighborhood than it is for each one to be at the trouble to raise the plants for himself.

Asparagus.—It should be cut with a strong round-pointed knife, and with care not to injure the dormant buds. If marketed, it should be washed and made into neat bunches. We have figured various bunching machines in former volumes.

Beans.—Do not put in the Limas until the long rains are over; thrust them into the soil, eye downwards. Two vines are enough to a pole, but to guard against accidents, put in four or five beans to each; the surplus may be transplanted to fill gaps. Sow a succession of the bush sorts.

Beets.—Sow a succession of early, and when the weather is settled, put in Long Blood for winter.

Cabbages and Cauliflowers.—Sow the later varieties. The plants of early kinds need frequent hoeing or raking, and this reminds us to repeat that a

Long-toothed Rake, one that has sharp teeth and will penetrate the soil, is the best possible implement for killing weeds just before they are visible, and to keep the soil well stirred among the plants.

Celery.—Sow in seed-bed; be sure and bring the earth in close contact with the seed by rolling or patting the soil well with the back of the spade. If a dry time comes on, water the seed-bed.

Sweet Corn.—Sow the early sorts for the first, and whatever may be the main crop, such as "Triumph," "Excelsior," put in seed every week or so.

Egg Plant is perhaps the most thoroughly tropical of all garden plants. Do not set out until really warm weather has set in, and then push with fertilizers, and fight potato bugs.

Sweet Potatoes, at the North, should be grown on ridges; put down rows of well-decomposed manure, 36 inches apart; build up over these, with plow and spade, ridges of earth, and plant the "slips" or "sets" on this at 15 inches apart. The first of June is early enough near New York.

Tomatoes, in every private garden, should have a trellis of some kind, not only for the sake of better fruit, but for neatness. Whatever will keep the plants up from the ground will answer.

Odds and Ends.—Do not forget the hoe figured last month....The general uselessness of garden reels, as now sold, was referred to last month. A friend sends the method of making a serviceable one, which will be found on another page.....Apply Paris green to potatoes as soon as up....Sow sweet herbs in a seed-bed for a supply of plants, to occupy the soil when other crops come off.... Thin all thickly-sown crops as soon as they can be handled, while the ground is moist....Dust squashes, melons, and all of that family, as soon as the plants are up, with fine air-slaked lime, or a mixture of plaster and ashes, to keep off insects.

Flower Garden and Lawn.

Lawns.—In making new lawns it is not necessary to sow oats or other grain with the grass seed, unless the work is done very late, and even then we should risk the grass without it, as it fills the soil with large roots, to the detriment of the grass.

Frequent Mowing before hot weather sets in, will help thicken the turf, but new lawns should be cut less frequently when drouths come on. If it has not yet been given, the established lawn should have a

Top Dressing of some fertilizer, and different from that applied the year before. Guano, ashes, bone, nitrate of soda, or plaster will be useful, and one or the other should be put on each year, using guano at the rate of 200 lbs. to the acre, and others in proportion.

Large Weeds in lawns, can only be eradicated by weeding; if the plantains, dandelions, docks, etc., appear, pull them in a moist time, or cut well below the surface with a knife. Annual weeds soon give way to frequent mowing, and die without seeding.

Bedding Plants from the greenhouse, should not be put out until settled weather, as cold storms give a check from which they are slow to recover.

Annuals may be sown; the labels upon the seed-packets usually state whether the plants will bear transplanting, or must be sown in place.

Climbers are useful for shade, for decorating verandas, and for making a screen to hide unsightly objects. Where the woody kinds can not be waited for, annuals may be used with good effect. Canary Vine, Thunbergias, Cobæa, Maurandias and others are all good, and some of the finer Morning Glories, though the flowers are short-lived, are very showy.

Roses.—Try White Hellebore for the Rose-slug. Tobacco water will kill plant lice, but for Rose-bugs, nothing short of hand picking persisted in, will abate these pests. Manure roses generously.

Greenhouse and Window Plants.

The plants that are to go out doors, should have a place where they will be partially shaded, and not be under the drip of trees. A thick layer of coal ashes upon which to stand the pots, will keep worms from working their way into the ball of earth.

Shading the Roots is important. When the pots are not plunged, it will be well to arrange boards so as to screen their sides from the hot sun.

Summer Bloomers, such as Fuchsias and most Cactuses if not wanted to decorate the verandas, should be kept in the greenhouse.

Shade should be provided for the plants that remain in the house. Whitewashing the outside of the glass is the easiest, though a cloth screen, provided with rollers, is sometimes used for shading.

Plants in the House need care as to insects, and should not lack proper watering.

Hanging Baskets whether in the greenhouse or on verandas, soon dry out, give a thorough soaking, by plunging in a tub of water at least twice a week.

Not too late for the Experiments.

SUGGESTIONS FOR THOSE MAKING THEM.

The most important number of this journal ever issued during thirty-seven years, was sent out last month. The *Fertilizer Experiments* proposed will be undertaken by a large number of farmers—we would be glad to have it done by not less than ten thousand. The information to be gained will be highly useful to every experimenter himself, to his neighbors, and of great value to the country generally. Negative results obtained will be as instructive as positive ones. It is almost as desirable to know what fertilizers, and what elements in this or that fertilizer, are *not* useful, and will *not* pay, on any particular soils or crops, as to know what will be useful and what will pay. The use of fertilizers obtained outside of the farm, *in addition* to those made on the farm, is already one of the chief means for securing a profitable increase in the products of the soil, in all the older States, and this will soon be the case even in what are now called the newer farm regions.—Just as Providence had hidden beneath the soil the vast stores of coal and oil, to be brought forth when needed, so we begin to find that inexhaustible supplies of fertilizers are coming to light in the earth, where they have existed unknown to man through countless centuries.—But we began this to say that there is

YET PLENTY OF TIME FOR THESE EXPERIMENTS.

Corn planting is not begun in at least two-thirds of the country, and this is an excellent crop for the experiments proposed. Potatoes are still to be planted in Northern regions, and the experiments upon these, and upon field beets and turnips, will be highly instructive also. Every one who has not done so, and can possibly do it, should still secure one of the sets of fertilizers, carefully reading over what was said on pages 128, 129, and 130, last month.

SUGGESTIONS FOR THE EXPERIMENTS.

Some additions to the particulars given last month may be stated. As advised then, the plots should be long and narrow, rather than square, to make up as far as possible for any unevenness in the quality of the soil. For the half-acre and acre plots, we recommended the strips to be 8 and 16 rods long, and one rod wide. (By mistake this was printed on the margin, 8 rods by "2 rods" wide). If they are even longer and narrower, all the better.

Lay out all the plots as accurately as possible, with a tape-line, or a pole marked in feet and inches. Drive strong stakes to mark the boundaries of the plots, and so deeply that they will remain, to distinguish them in coming seasons, as future lessons from this season's experiments will be important.

Read carefully the directions and explanations, and have plans complete and clearly in mind in advance. Select as uniform soil as possible. Level

is best; but, if sloping, let the plots run up and down the slope, so that any wash by rains will not carry the fertilizers from one plot to another. As far as possible, a fair sample of the whole field is desirable, and in a field which is nearest like the majority of the whole farm.

For testing the wants of the *soil* itself, that which is poor or nearly worn out should be selected. Also one not having remaining in it much of previous fertilizers or manures, or of green crops plowed in. We then get the effect of the experimental fertilizers alone upon the natural soil itself.

To test the action of the fertilizers upon a particular crop, soils in better condition may be used. Remember, particularly, to have the fertilizers well mixed with the soil, otherwise they may injure the young plants.

Plant or sow precisely the same number of rows, drills, or hills, on each plot, and see that no shade trees or other circumstances affect one plot different from another.

One of the most important items is, to leave plots without any fertilizer, for comparison—to show just what is the effect of each fertilizer or combination of fertilizers as compared with *no* manure. We have advised leaving one such vacant plot on each side. It will be still better to leave one through the middle, or even two interior ones—say the fourth, and the seventh or eighth. It will be instructive, also, to add other plots, and try upon them, severally different farm manures, lime, and other materials at hand.

Commercial Matters—Market Prices.

The following condensed, comprehensive tables, carefully prepared specially for the *American Agriculturist*, from our record kept daily during the year, show at a glance the transactions *for the month ending April 12th*, 1879, and for the corresponding period last year:

1. TRANSACTIONS AT THE NEW YORK MARKETS.

RECEIPTS.	*Flour.*	*Wheat.*	*Corn.*	*Rye.*	*Barley.*	*Oats*
26 d's *this* m'th	413,000	3,457,000	2,916,000	314,000	207,000	811,000
23 d's *last* m'th	359,000	3,215,000	2,119,000	226,000	409,000	409,000
SALES.	*Flour.*	*Wheat.*	*Corn.*	*Rye.*	*Barley.*	*Oats.*
26 d's *this* m'th	395,000	8,431,500*	5,687,000*	439,000	291,000	1,213,000
23 d's *last* m'th	328,000	8,103,000*	4,207,000*	372,000	263,000	1,093,000

* Including sales for forward delivery.

2. *Comparison with same period at this time last year.*

RECEIPTS.	*Flour.*	*Wheat.*	*Corn.*	*Rye.*	*Barley.*	*Oats.*
26 days 1879	413,000	3,457,000	2,916,000	314,000	207,000	811,000
27 days 1878	271,000	3,102,000	1,413,000	293,000	387,000	496,000
SALES.	*Flour.*	*Wheat.*	*Corn.*	*Rye.*	*Barley.*	*Oats.*
26 days 1879	395,000	8,431,000	5,687,000	439,000	291,000	1,213,000
27 days 1878	326,000	3,491,000	3,105,000	412,000	563,000	619,000

3. *Stock of grain in store at New York.*

	Wheat. bush.	*Corn.* bush.	*Rye.* bush.	*Barley.* bush.	*Oats.* bush.	*Malt.* bush
Apr. 8, 1879	2,629,068	804,584	402,232	620,368	85,577	
Apr. 10, 1878	1,370,081	541,648	106,373	396,861	857,273	233,424

4. *Exports from New York, Jan. 1, to April 10.*

	Flour. bbls.	*Wheat.* bush.	*Corn.* bush.	*Rye.* bush.	*Barley.* bush.	*Oats.* bush.	*Peas.* bush.
1879	824,400	10,708,000	7,694,500	850,700	68,700	85,200	142,850
1878	770,100	12,898,746	5,282,029	974,966	1,153,912	86,564	145,351
1877	873,057	2,873,510	5,638,140	851,280	121,229	53,125	117,060
1876	569,514	4,904,177	3,068,928	43,320	——	63,894	258,251

Liberal receipts of Produce from the interior, and generally less favorable reports from foreign as well as Western markets—the latter reflecting, in part, the encouraging prospects for the winter-sown crops—have served to depress prices of Breadstuffs during the month, especially toward the close, without stimulating business materially, whether for shipment, home use, or on speculators' account. Winter Wheat left off very heavily, Spring Wheat weak, and Corn, Barley and most grades of Flour also in favor of buyers. Rye comparatively steady, benefited by the requirements of purchasers for the Continent....Dealings in Provisions have been more extensive—in Hog products, particularly Lard, of unusual magnitude, at however, variable figures. The speculations in Lard were mainly in connection with the export trade, and chiefly for Germany, quickened by the apprehensions of adverse changes in the tariff of that country. At the close, Pork, Lard and Bacon showed less firmness; Butter and Cheese ruled lower, and not in much request; Beef, steady, but quiet; Eggs, much cheaper.....In Cotton an extraordinarily active movement has been reported, almost wholly in the speculative line, carrying up prices nearly 2 cents per pound, on reports of light arrivals at the shipping ports and reduced crop estimates, the market closing rather buoyantly, though feverish and sensitive....Wool has been yielding slightly in values, on somewhat freer offerings and a moderate call for supplies, the near approach of the season for the new clip tending to lessen the confidence of operators....Seeds have met with much less attention, and have been quoted more or less nominal....Hops have been offered lower, and have been rather difficult to market at even the reduced quotations. Export inquiry light....Hay and Straw weaker in prices, and without much animation in the dealings. ....Tobacco has been in pretty fair demand, within the previous range....Petroleum and Naval Stores more sought after, and quoted higher....Ocean freights have been fairly active, but rates have been ruling very low on nearly all classes, due in good part to the sharp competition of the ocean steam lines for cargo, both of local and through freight. Some improvement in the carrying interest is looked for on the resumption of inland navigation, now near at hand.

CURRENT WHOLESALE PRICES.

	Mar. 12.	Apr. 12.
FLOUR—Super to Extra State	$3 35 @ 4 25	$3 25 @ 4 25
" Super to Extra South'n.	3 35 @ 6 50	3 25 @ 6 50
" Extra Genesee	4 00 @ 5 75	4 25 @ 5 75
" Superfine Western	3 35 @ 3 75	3 25 @ 3 60
" Extra Western	3 75 @ 9 00	3 60 @ 8 75
" " Minnesota	3 85 @ 8 75	3 65 @ 8 50
RYE FLOUR, Superfine	2 75 @ 3 25	2 75 @ 3 25
CORN-MEAL	2 00 @ 2 70	2 00 @ 2 40
OAT MEAL, ₱ bbl	3 00 @ 6 00	3 00 @ 6 30
WHEAT—All kinds of White	1 05 @ 1 16	95 @ 1 15
" Red and Amber	82 @ 1 15½	95 @ 1 15
" Spring	78 @ 1 08	75 @ 1 05
CORN—Yellow	45 @ 53	44¾@ 52½
" White	45 @ 51	45 @ 52
" Mixed	44 @ 47	43 @ 46½
OATS	31 @ 37½	30 @ 43
RYE	60 @ 63	57 @ 63
BARLEY	70 @ 1 20	50 @ 1 07½
HAY—Bale, ₱ 100 lbs	30 @ 80	30 @ 75
STRAW, ₱ 100 lbs	30 @ 60	25 @ 55
COTTON—Middlings, ₱ lb	9¾@ 9¾	11¾@ 11½
HOPS—Crop of 1878, ₱ lb	5 @ 15	5 @ 13
" 1877, ₱ lb	3 @ 5	2 @ 4
" olds, ₱ lb	2 @ 4	1 @ 2
FEATHERS—Live Geese, ₱ lb	30 @ 45	30 @ 45
SEED—Clover, West. & St. ₱ lb	6 @ 7½	6 @ 7
" Timothy, ₱ bushel	1 30 @ 1 50	1 30 @ 1 50
" Flax, ₱ bushel	1 35 @ 1 40	1 35 @ 1 40
TOBACCO, Kentucky, &c., ₱ lb	2½@ 12½	2½@ 12½
" Seed Leaf, ₱ lb	7 @ 50	7 @ 50
WOOL—Domestic Fleece, ₱ lb	20 @ 38	18 @ 37
" Domestic, pulled, ₱ lb	17 @ 35	16 @ 35
" California	12 @ 25	11 @ 25
TALLOW, ₱ lb	6¾@ 6¾	6½@ 6¾
OIL-CAKE—₱ ton	27 00 @28 00	27 00 @ —
PORK—Mess, ₱ barrel	9 05 @10 65	9 37½@10 62½
" Extra Prime, ₱ barrel	— @ —	— @ —
BEEF—Extra mess	10 50 @11 50	10 50 @11 50
LARD, in trcs. & bbls, ₱ 100 lb	6 40 @ 6 85	6 30 @ 6 87½
BUTTER—State, ₱ lb	12 @ 25	9 @ 20
" Western, poor to f'cy, lb	7 @ 28	6 @ 28
CHEESE	3 @ 9¼	3 @ 8¾
EGGS—Fresh, ₱ dozen	15½@ 17½	11½@ 13½
POULTRY—Fowls, ₱ lb	8 @ 13	10 @ 15
" Chickens, ₱ lb	10 @ 17	11 @ 16
" ₱ pair	— @ —	50 @ 1 00
" Roosters, ₱ lb	— @ —	7 @ 10
Turkeys—₱ lb	10 @ 16	15 @ 20
Geese, ₱ pair	1 00 @ 1 75	75 @ 2 00
" ₱ lb	— @ —	5 @ 14
Ducks, ₱ pair	45 @ 90	50 @ 90
" ₱ lb	10 @ 18	12 @ 21
DUCKS, Wild, ₱ pair	15 @ 2 00	20 @ 1 00
SNIPE, per doz	— @ —	1 25 @ 1 50
PIGEONS, ₱ doz	75 @ 3 00	1 25 @ 4 50
HICKORY NUTS—₱ bush	1 50 @ 2 37	— @ —
APPLES, ₱ barrel	1 00 @ 2 75	1 00 @ 2 50
ORANGES, ₱ bbl	4 00 @ 8 00	6 00 @10 00
" ₱ box	1 25 @ 4 00	— @ —
STRAWBERRIES, ₱ quart	— @ —	25 @ 33
BEANS—₱ bushel	1 30 @ 2 40	1 15 @ 2 70
PEAS—Canada, in bond, ₱ bu	70 @ 73	— @ 78
" new So., ₱ crate	5 00 @ 6 00	1 25 @ 4 60
STRING BEANS, new, ₱ bush	— @ —	4 00 @ 4 50
POTATOES, ₱ bbl	2 00 @ 3 25	2 00 @ 3 37½
" new	5 50 @ 7 00	9 00 @11 00
" Sweet, ₱ bbl	2 00 @ 3 37½	3 00 @ 4 00
TURNIPS ₱ bbl	87½@ 1 25	75 @ 1 25
TOMATOES, new, ₱ small box	25 @ 63	1 00 @ 1 25
RADISHES, new So. ₱ 100 bun	1 75 @ 2 50	1 00 @ 1 50
BROOM-CORN	2 @ 5¼	2 @ 5¼
BEETS, new, ₱ crate	— @ —	1 50 @ 2 00
ASPARAGUS, new, ₱ 100 bunc.	— @ —	6 00 @ 9 00
CABBAGES—₱ 100	4 00 @ 8 00	4 00 @ 7 00
SPINACH, So., ₱ bbl	2 75 @ 3 50	2 00 @ 3 00
ONIONS—₱ bbl	2 50 @ 5 50	4 00 @ 5 00
CELERY, per dozen	65 @ 1 00	— @ —

New York Live-Stock Markets.

RECEIPTS.

WEEK ENDING	*Beeves.*	*Cows.*	*Calves.*	*Sheep.*	*Swine.*
Mar. 17	7,541	88	1,272	19,933	30,453
Mar. 24	9,204	34	1,941	21,821	20,931
Mar. 31	9,602	115	2,300	17,904	31,369
Apr. 7	9,755	40	2,820	21,785	34,797
Apr. 14	8,148	49	3,182	20,073	26,996
Total for 5 Weeks	44,250	326	11,515	104,516	143,645
do. *for prec. 5 Weeks*	48,279	450	5,511	115,997	109,728

	Beeves.	*Cows.*	*Calves.*	*Sheep.*	*Swine.*
Average per Week	8,850	65	2,303	20,903	28,729
do. do. *last Month*	9,636	90	1,602	23,199	33,944
do. do. *prev's Month*	10,148	193	866	22,724	36,626

The prices for the past five weeks were as follows:

WEEK ENDING	*Range.*	*Larger Sales.*	*Aver.*
Mar. 17	8¼@11 c.	9 @ 9¾c.	9¼c.
Mar. 24	8 @10¾c.	8¾@10 c.	9 c.
Mar. 31	8 @11¼c.	9 @10½c.	9¼c.
Apr. 7	7 @11¾c.	9 @10½c.	9¼c.
Apr. 14	7¼@11 c.	9 @10¾c.	9¼c.

Beeves.—The market has been unusually irregular the past month. Constant changes from day to day have occurred which have made business very unsatisfactory. The see-saw action resulting from the depressing influence of the dead-meat trade on the one hand, and the helpful one of the foreign export on the other, has left the market, after its many changes, very nearly where it started, and at the close of our report it remained firm, with a somewhat slow trade. Among the notable sales was one of corn-fed Colorado beeves at 9¾ to 10c. per lb., to dress 56 lbs. to the cwt. 550 head were taken for export on the 1st April, at 10¾ to 10¾c. per lb.; good native steers sold at 10¼c. per lb., to dress 57 lbs., and extra cattle brought 10¾ to 11c. per lb. Dressed beef was heavy at 7¾ to 8c. per lb ...**Cows.**—There has been a light business in cows at $25 per head for poor, to $60 per head for choice stock....**Calves.**—A decline of ½ to 1c. per lb. is to be noted in veals. Common to prime closed at 4 to 5¼c. per lb., live weight. Hog-dressed were lower, at 5 to 7c. per lb. for New York State, and 6 to 7¼c. for New Jersey....**Sheep and Lambs.**—Prices are lower for this stock, the decline marking ½c. per lb. Clipped sheep sold at the close at 4¾ to 5¼c. per lb., alive; fair to prime wooled sheep were 4¾ to 6¼c., and choice wethers brought 6¾ to 6¾c. per lb. Spring lambs are selling at $6 per head to 10c. per lb., and dressed mutton at 8 to 9c. per lb....**Swine.**—Business has ruled dull at 3¾ to 4c. per lb. for Western live hogs; City-dressed were irregular at 5 to 5¾c. per lb; and Country-dressed were steady at 6 to 6¼c. for light, and 5¼ to 5¾c. per lb. for heavy.

The Horse Market.—Arrivals have been large, chiefly of small horses from the West. Several car-loads of Canadians, among which were a few fine carriage horses, have come in. The demand has been active, but without advance in prices. The usual spring demand from farmers has begun, and promises to be good at $250 to $275 for fair teams, and $300 and over for choice pairs. Single horses have been taken for city use at $100 to $125 for light, and $225 to $325 for heavy cart horses. The breeding of the latter class of horses promises to be worth the notice of those concerned. A regular trade is now begun in Shetland ponies by Mr. Kirby, 54 Courtland Street, New York, who has received his second consignment of 23 head. The shipment of 500 mules to Africa is also a new feature in this market.

Prices of Feed.

Bran, per ton	$16.00@$18.00
Middlings, per ton	19.00@ 20.00
Ground Feed, per ton	21.00@ 23.00
Linseed-oil-cake, western, per ton	35.00@ 40.00
Cotton-seed-cake, per ton	25.00@ —
Chandler's Scraps, per ₱	2@ 3

Prices of Fertilizers.

Nitrate of Potash (95 per cent.), per lb	9 @9¼c.
Sulphate of Potash (potash 44 per cent) per lb	2 @3¼c.
do. do. (potash 27½ per cent) per lb	1¾@1¾c.
German Potash Salts (potash 12 to 15 p. c. p. ton	$15.00@18.00
Muriate of Potash (potash 50 per cent), per lb	1¾@2 c.
Nitrate of Soda, per lb	3¾c.@4¼c
Sulphate of Ammonia (25 per cent.), per lb	4¼c.@4½c.
Dried Blood (ammonia 13 per cent) per ton	$40.00@45.00
No. 1, Peruv. Guano 10 p. ct. ammonia, standard, ₱ ton	$56.50
do. do. Lobos, do. do. do	47.50
do. do. guaranteed, ₱ ton, cargo J	50.00
do. do. rectified, per ton, 10.20 p. c.	60.00
do. do. do. do. 8.40 p. c.	51.00
Soluble Pacific Guano, ₱ ton	45.00
Excelsior Fertilizer Works, Fine Ground Raw Bone	55.00
Mapes' Complete Manure (clay soils) per 1,000 lbs	25.00
do. do. do. (light soils) per 1,000 lbs	25.00
do. Grass and Grain Top-dressing, ₱ 1,000 lbs	25.00
do. Fruit and Vine Manure, do.	17.50
do. Bone, strictly pure, meal ..... per ton	42.00
do. do. do. medium ..... do.	36.00
do. do. do. dissolved ..... do.	42.00
do. Potato Manure ..... per 1,000 lbs	22.50
do. Corn do. ..... per 1,000 lbs	22.75
Stockbridge Corn Manure, per acre	20.00
" Potato do do	10.00
" Tobacco do do	50.00
" Rye do do	10.00
" Wheat do do	15.00
Bowker's Hill and Drill Fertilizer, per ton	45.00
Baugh's Raw Bone Phosphate, per ton	38.00
Baugh's Manure for Tobacco and Grain, per ton	45.00
Walton Wharn & Co.'s Raw Bone Phosphate	40.00
Gypsum, Nova Scotia, ground, per ton	5.00

A Creamery and a Farm Butter Dairy.

Prize Offered for Plans.

Some forms of association or coöperation being profitable are likely to be adopted more generally than they are at present. The cheese factory is an example of this; it is a purely American institution, the rapid increase of which, abroad as well as at home, attests the practicability and profit of association among farmers for a specific object.

By making cheese in the factory, the large quantities operated upon secure uniformity in the product; certain manipulations are essential, and there must be a certain expenditure of time by the operator, whether for one cheese or a hundred, and on a large scale there is a great saving in these matters. One important result of making cheese at the factory is a great lessening of the labors of the farmer's wife. These are but a few of the advantages of associated or factory cheese-making, which has been so successful that there is a widespread desire to apply the system to butter-making also.

While there are creameries, as butter factories are called, they are far less numerous, and their requirements and workings seem to be less generally understood than are those of cheese factories. In many neighborhoods where butter is made upon the farm the question of associated butter-making is earnestly discussed, and in some cases creameries have been started without, it is feared, proper knowledge of the subject.

A warm friend of the *American Agriculturist*, who is largely engaged in farming in a locality where butter made in the home dairy is a leading product, has become, with his neighbors, much interested in

the proposal to establish a creamery in his vicinity. Being impressed with the meagre information as to the details of such a product readily accessible, and desirous that those elsewhere as well as in his own neighborhood should have more definite data than he has been able to find, he proposes that we shall, on his behalf, offer prizes for

Best Plan and Description of a Creamery.

These plans must not only cover the building itself, but its entire outfit and the arrangement of the apparatus to secure the most economical working of the milk of from 100 to 500 cows.

Without attempting to enumerate every point to be provided for, the following are suggested:

THE BUILDING.—Its location; ease of approach with loaded wagons; plans and elevations sufficiently in detail to work from and drawn to a scale; full specifications should accompany the plans, to include everything belonging to the building itself; also an estimate of the cost.

OUT-BUILDINGS.—Plans of whatever are necessary are to be given, such as ice-house, boiler and engine-house, etc.

ADJUNCTS.—The water supply; drains to carry off all the wastes of the establishment; ice-ponds, or other sources of ice; a piggery, in case the whey is to be fed out, will be needed.

HEATING, COOLING, AND POWER.—A boiler and pipes for conveying steam; refrigerators or cool room for milk, cream, or butter; steam engine, or other motive power.

APPARATUS.—Include everything needed for the reception and prompt weighing or measuring the milk; for setting the milk and separating the cream; vessels for holding and keeping cream; churns; butter-workers, and whatever else is necessary in the production of butter.

MARKETING.—Packages, stamps, moulds, cases, delivery tubs, marking plates.

SKIM-MILK.—The disposal of this must be considered, and the necessary apparatus for making skim-milk cheese provided.

CLEANLINESS.—Provision for thoroughly cleansing every utensil used, the building itself, and those therein employed; also ventilation.

In the use of the word "Plans," it is not restricted to the plans for the building, but comprises the entire outfit, or, as the English say, "plant" of a creamery. A treatise on butter-making in a creamery is not sought, but a full enumeration of all the appliances by which it is made is desired, together with the probable cost.

The drawings and necessary descriptive matter, written in black ink upon one side only of foolscap paper, are to be sent without the author's name. (The name is to be sent in a sealed envelope, upon which is a word or motto corresponding with a similar one upon the plan.)

The plan receiving the prize to become the property of the gentleman offering the prize.

The plans, etc., should be directed to the care of Orange Judd Company, marked "Creamery Plans," and should be in on or before July 1st.

For the best plan, etc., a cash prize of **$75.00.**

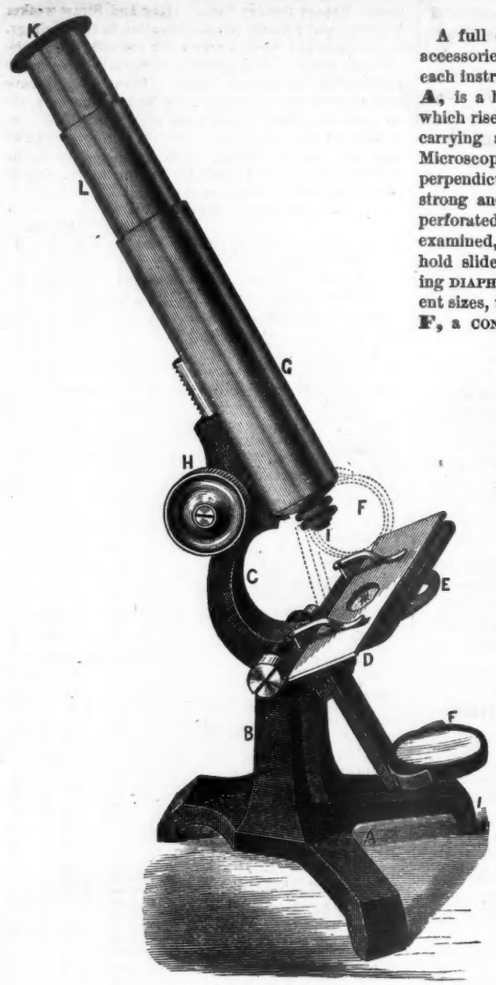
A Butter Dairy for the Farm.

Prize Offered for Plans.

In view of the fact that the highest excellence in butter-making can only be reached, where the operations are carried on in a properly appointed building, devoted to no other uses, and that great improvements have been made within a few years in the appliances and methods of the farm dairy, prizes are also offered for a private butter dairy arranged for the milk of five up to twenty cows. This offer requires plans for a separate building and its complete outfit of the apparatus best adapted to butter-making on this smaller scale.

The plans should be made with a view to utilizing the facilities afforded by an ordinarily well appointed farm—such as, for example, the water supply, ice house, etc. The same general conditions as for the creamery above given, will be observed.

For the best plan, etc., a cash prize of **$25.00.**



DESCRIPTION.

A full description of the Microscope and its accessories, and how to use them, accompanies each instrument. The following is a brief outline: **A**, is a heavy, neatly japanned iron FOOT, from which rise two pillars, **B**, with trunnions between, carrying all the other parts, and allowing the Microscope to be used at any desired angle between perpendicular and horizontal. These parts are strong and solid, to give steadiness. **D**, a large perforated hard rubber STAGE, to support objects examined, with spring CLAMPS, easily adjusted to hold slides, etc., or to be removed. **E**, a revolving DIAPHRAGM, perforated with openings of different sizes, to graduate the amount of light desired. **F**, a CONCAVE MIRROR on a MOVABLE ARM, arranged to be turned to light coming from any direction—to be used *below* for transparent objects, and *above* (see dotted lines) for opaque objects. **C**, a curved arm, carrying the BODY **G**, which is nickel-plated. The body is raised or lowered and adjusted with great nicety by a very efficient, smooth-working RACK and PINION, moved by the MILLED HEADS **H**, (one is hidden from sight in engraving). **I**, two OBJECT GLASSES, used separately or together, according to the power desired. The greatest care is taken with these object glasses, and we feel sure that they are far superior to anything ever offered, except for very much higher priced instruments. The image produced by them is again magnified by the eye-piece **K**, (illustrated and described on next page). This fits into the DRAW-TUBE **L**, 3½ inches long, which thus allows the body to be materially lengthened, and by removing the eye-piece further from the image, increases the magnifying power. The great advantages of this will be very apparent in using it. *Every part of the Microscope is made in the most thorough workmanlike manner, and it is constructed with a view to the most efficient service.* (SEE NEXT PAGE.)

NEW AMERICAN AGRICULTURIST

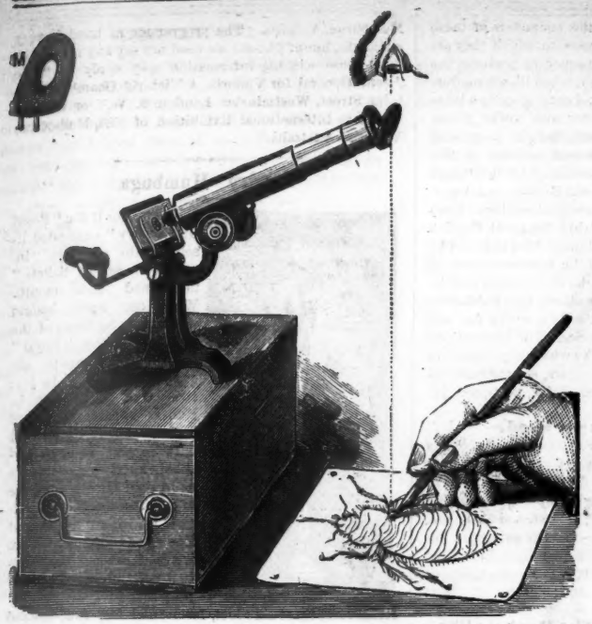
COMPOUND MICROSCOPE.

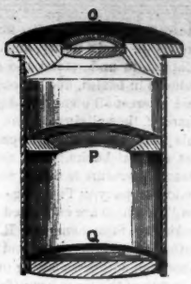
Magnifies 100 to 125 Diameters (or 10,000 areas and upward), with excellent defining power, Jointed Stand, fine Rack and Pinion, Movable Eye-Piece and Draw-Tube, Double Object Glasses, Stage, Springs, Revolving Diaphragm with different apertures, Mirror adjustable to transparent and opaque objects, etc. Has the principal and essential attachments of a $100 Compound Microscope, and ALSO the CAMERA LUCIDA.

The Publishers of the *American Agriculturist* announce with great pleasure, that after long efforts, with the aid and great skill of the BAUSCH & LOMB OPTICAL COMPANY, they have finally brought the above most valuable combination within reach of all those who could not afford the necessarily high cost, hitherto, of so desirable an instrument. Though equal in power and essentials to a Microscope and Camera Lucida costing $50 and upward, this can be retailed for $15, and to Subscribers to the *American Agriculturist*, for 1879, *for whom it was specially designed*, but was not completed in time to offer before, it will now be supplied for $10. Each instrument, with Camera Lucida, goes in a neat handy Walnut Case; also hollowed glass slide, 4 plain slides, 6 thin glass covers, 2 mounted objects, and a microscopic treatise, giving full explanations and instructions for use, mounting objects, etc., etc.

The above instrument is a most remarkable one. For all practical purposes, it is as useful as anything ever before offered under $50, or more. Only a few persons pursuing special investigations, will need any more powerful or perfect Microscope. Prof. SPENCER F. BAIRD, Secretary of the SMITHSONIAN INSTITUTION, at Washington, happening into the office on other business, saw one of these new *American Agriculturist* Compound Microscopes on the table, and after examining it thoroughly, he pronounced it one of the most complete and handy instruments, for general use, that he had ever seen, and immediately ordered one for the Institution—at the same time requesting a good supply of the descriptive circulars sent along with it, that he might give them to the large number of students and investigators who are from time to time at the Institution, and who want just such an instrument.—The highest commendations have also been received from Prof. Asa Gray, of Harvard University, and from many other distinguished scientific and professional men.——*No more interesting and useful an apparatus could be introduced into any family, in country or city.*

NOTE.—The first 100 of these Microscopes cost an average expense of over $20 each. We have now reached a point where, with all facilities complete, by the use of machinery in constructing the various parts, we shall be able to supply them to all *our subscribers* who want them at $10 each—though the regular price to others will be $15. Address Publishers of *American Agriculturist.*





THE EYE-PIECE is shown above in *section*. (It is seen in place at K on the opposite page.) The use of this is to magnify the image formed by the lower, or object glasses. In low-priced instruments this is usually a glass fastened in at the end of the body of the Microscope, but in this instrument we have a regular separate eye-piece, as furnished with the most costly Microscopes. As shown in section, we have first the lower, or *Field-glass*, Q, which receives the *image* formed inside of the BODY by the Object Glasses. Above this is a *Diaphragm* of blackened metal, P, to cut off all unnecessary rays, and give a more distinct image, which finally falls upon the *eye-glass*, O, and that transmits the greatly enlarged image to the eye. Both glasses are mounted in frames and attached by removable screws. This eye-piece is 2 inches long, and, with the Draw-Tube, adds over 5 inches to the length of the body, when desired.

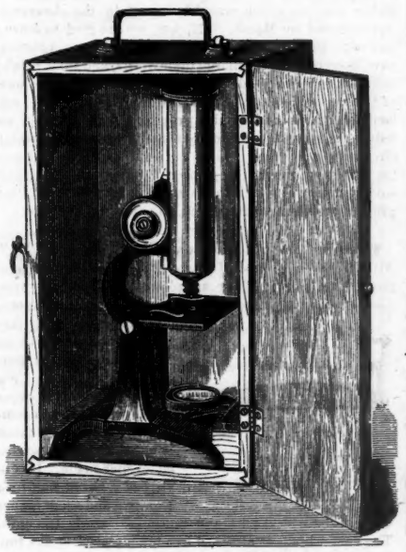
THE MICROSCOPE

AS USED WITH THE

CAMERA LUCIDA.

A most interesting and valuable attachment to this NEW MICROSCOPE, *enabling any one to throw upon paper a greatly magnified Image of objects too small even to be seen by the unaided eye, and to make accurate sketches or pictures of the objects in very large size, for permanent preservation.*

A most important feature of this New Microscope is the newly devised CAMERA LUCIDA Eye-piece Attachment. This accomplishes in a very simple but effective manner, what has previously required most costly arrangements, that have been chiefly used only with very expensive microscopes. *This Camera Lucida is alone fully worth all the cost of the microscope and the entire apparatus.* For example, place in the microscope a small bit of the end of the leg of a fly, or of the antenna or feeler of a bee or other insect, or any other minute object barely visible to the unaided eye. It will be magnified 50 to 100 or more *diameters* (or many thousands of *surfaces*). With the Camera Lucida, the magnified image is clearly seen upon the paper, so that one can with a pencil, trace it accurately in large size, in all its parts, its hairs, markings—in short, produce permanently upon paper, for preservation and exhibition, an accurate sketch of the wonderful developments which the microscope reveals to the eye.—The application of this Microscope has a very wide range. With the Draw-tube and Eye-piece closed in, and by removing the lower Object-glass, the power can be reduced to 25 diameters, so as to examine the whole of a small insect at one view; while by putting on all the power (100 to 150 diameters), the foot of a fly, for example, will be expanded to cover the whole field of vision. Full explanations for using Microscope, Camera Lucida, preparing specimens, etc., etc., with general instruction, accompany each instrument.



Walnut Case (8×5×4 inches) constructed to hold the closed Microscope firmly in carrying it, and preserve it from dust and injury when not in use. It has receptacle for slides, and other accessories, for specimens, etc.

The CAMERA LUCIDA, is a most interesting and *valuable attachment.* For example: Take a bit of clean glass, breathe upon it to dampen it; then simply touch it with the wing of a Butterfly or Moth. A bit of fine dust hardly visible to the unaided eye will adhere to the glass at some point. Place this point on the Stage of the Microscope, and a mass of beautiful feather-like scales from an inch to three inches in length will be seen, with comb-like ends and various markings. These will be alike for the same species, but of the thousands of different butterflies and moths, these feather-scales will be as different in form, colors, marking, etc., for each species, as are the feathers of different kinds of birds. Apply the Camera Lucida, and the feathers will be thrown upon paper in their true form and color, and may then be easily traced and sketched with a pencil, and even colored, if desired. We have drawings of such feather-scales from wings of butterflies, three or four inches long and two inches or more wide, made with this new Microscope, from the dust on the wings of the insects, which was scarcely visible upon the bit of glass. *There is an unlimited field for the application of this Microscope and the Camera Lucida.*

containing a great variety of Items, including many good Hints and Suggestions which we throw into smaller type and condensed form, for want of room elsewhere.

Clubs can at any time be increased by remitting for each addition, the price paid by the original members: or a small club may be made a larger one at reduced rates, thus: One having sent 6 subscribers and $7, may afterwards send 4 names more and $3, making 10 subscribers for $10.00; and so for the various other club rates.

Bound Copies of volume 37, and of every previous volume back to Vol. XVI. (1857), neatly bound, with gilt backs, Index, etc., are supplied at $2 each (or $2.30 if to be sent by mail). See Publishers' Notes, 2d cover page.

The German Edition.—All the principal articles and engravings that appear in the *American Agriculturist* are reproduced in the German edition. Besides these, there is a special department, edited by an eminent German cultivator. Our friends can do us a good service by calling the attention of their German neighbors and friends to the fact that they can have the paper in their own language, and those who employ Germans will find this Journal a most useful and acceptable present.

Read the Advertising Columns.—Letters are daily received by the editors, asking where pigs, fowls, seeds, fertilizers, machinery, etc., can be procured. We consider all the information of this kind that is given in the advertising pages sufficient, if those needing anything will only look there; and can not find room to repeat what is already plainly told elsewhere. Every page of the *American Agriculturist*, including the covers, is interesting reading, and should all be carefully examined every month. In addition to looking after what one may want, the reading of what others have to say, in offering their wares, etc., starts up some new idea in the mind of the reader.—When writing to any advertiser, always tell him in what paper his advertisement was seen.

The Australian Exhibition is to open at Sydney, in August next, and will be largely, of course, Agricultural, though other departments will be amply provided for. Special buildings have been erected in Prince Alfred Park, and every facility will be afforded to exhibitors. Our Makers of Agricultural machines and similar wares should make use of this opportunity to present their wares to the enterprising farmers of the colony, and we hope that American industry will be largely represented at this exhibition not only because we think it will be profitable, but in some measure to show our appreciation of the most interesting contributions made by the Australians to our Centennial.

The American Pomological Society.—Just as last month's paper was going to press we were informed that this Society had been invited to hold its next session in New York City. Knowing that the subject of meeting here had been discussed, we supposed the information to be correct, and made the announcement. We too late learned that this was an error. The Society will not meet in New York, and we can not at the moment of closing our pages say where the meeting will be held. Probably the condition of its President, Colonel Wilder, the severe accident to whom is elsewhere noticed, may influence the selection of the locality.

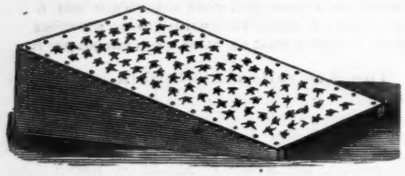
Basket Willows.—"J. S.," Brady's Bend, Pa. Basket willows may be grown upon any good farm land, from cuttings about a foot long. We would not advise you to undertake their culture unless you are sure of a market. The basket makers are nearly all foreigners, and such is their prejudice against stock grown in this country that it would be very difficult for you to dispose of your product in the New York market.

The New York Bench Show of 1879.—The Annual Bench Show of Dogs has become a regular institution in this country, and the third one held in New York, on the 8th to 11th of April, was, by far, the most interesting and popular of the series. There was an unfortunate oversight in not having gentlemen of urbane manners, with a little less *hauteur* and not on the small-beer order, to encourage and facilitate the labors of those who, by pen and pencil, endeavor to encourage and develop such shows by directing to and fixing public attention upon them. Barring the general complaints on this point, which will doubtless be obviated another year, everything passed off successfully and pleasantly. We have selected for an engraving for our first page a few of the most popular among the dogs exhibited, and those which may be taken as types of their classes. The dog on the upper left hand corner is "Sefton," a beautiful

lemon and white animal owned by Mr. E. A. Willard, of Illinois. The next below him is "Major," a Newfoundland dog owned by Mr. Gilson of New York. This animal has saved three lives from drowning, and if for no other reason, deserves to appear in our picture. The dog at the bottom left hand corner is an Irish Water Spaniel, "Mack," owned by Mr. Lawler, Mt. Vernon, N. Y. On the upper right-hand corner is a Scotch Collie, "Ray," owned by Mr. Watts of New York, a sprightly specimen of the erect-eared variety of the Shepherd's Dog; with him is shown a pet Yorkshire Terrier, "Charlie," owned by Mrs. Haines. Under these is a Russian Setter, "Czar," a notable dog, the property of Mr. Edwin Smith, of Newark, N. J.; with him is a Japanese Spaniel, "Prinnie," owned by Mrs. Pratt, of New York. The native bred Setter, "Jersey Duke," owned by Mr. Von Lengerke, of Hoboken, N. J., is shown at the bottom right hand. This dog is a remarkably fine specimen of his breed.

EVERY SCHOOL, Public and Private, and Every Academy and Seminary, not already supplied, ought to have one of the new COMPOUND MICROSCOPES, described *on page* 172. Never before has there been an opportunity for so complete, so interesting, and so useful an instrument, at anything like so small a cost. In at least one public school the pupils are already engaged in making sketches from natural objects with the Camera Lucida of this instrument, for exhibition at the next Queens County Agricultural Fair. It would not be difficult to secure one of these Microscopes at the present low price, for every public school in the country, either by use of general funds, or by a subscription among the patrons. This Microscope brings into plain view, all around us, a beautiful and interesting world of objects a hundredfold more numerous than all our unaided eyes behold. It would be a great treasure in any *home* also.

A Horse-Radish Grater.—A correspondent, whose name we have mislaid, sends a sketch of a home-made grater. Two wedge-shaped pieces of board a foot long and three inches wide at one end, with a piece to go



across at the wide ends are nailed together; upon this frame is tacked a tin—a piece from a fruit can will answer—perforated with rough holes—as shown in the engraving. Such a grater will be useful for many other purposes besides preparing horse-radish.

Quinby's New Bee-keeping.—This volume, which was announced as in preparation, is now in press. Mr. Quinby's work, in its earlier editions, has long been the standard practical guide on all matters relating to the apiary. Soon after the last revision of the work appeared (in 1865), discoveries and inventions were made that greatly modified the practice, and wonderfully advanced the art of bee-keeping. Feeling that his work was incomplete in lacking these important matters, Mr. Quinby had arranged for a new edition which should include these, but his sudden death prevented its completion. Fortunately his son-in-law, and many years business associate, Mr. L. C. Root, has undertaken the revision, as he is not only better qualified than any one else to give Mr. Quinby's latest views, but by long practice and close observation, is able to contribute much of value from his own experience. The Book is essentially a new one, having been re-written almost entirely, and it is illustrated with a large number of engravings, most of which are new. There is no other work that so completely presents the present condition of apiarian knowledge and practice, and while it keeps in view the business aspects of the subject, the wants of those who would keep bees for their own amusement, or to produce a family supply of honey, are also provided for. Published by the Orange Judd Company, price $1.50, post-paid.

A New Work on Dogs.—Much has been written upon the dog from an agricultural point of view that is not at all favorable to that animal. But there are dogs and "dorgs," and however we may condemn the worthless, sneaking, sheep-killer, the love for a faithful, intelligent, and affectionate animal, is altogether too common and too deeply implanted in the make-up of most men for it to be shaken by the misdeeds and general worthlessness of the discreditable members of the race. A new work on dogs has no reference to the mongrel, nondescript, nameless beasts that are known by the general term of cur. The breeding of dogs for different uses has been followed so long, that the personal peculiarities that best adapt them to the different purposes for which they are to be employed are thoroughly stamped upon and mark the different breeds. To know the characters of these breeds in their purity, and the uses to which they are adapted, to understand the care proper to preserve the animals in health, and to treat them when ill, are matters that interest all owners of dogs, and consequently a large share of those living in the country, and works giving this information are properly included in a general list of rural books. The most recent addition to this class of literature is a new work, published by the Orange Judd Company, "The Dogs of Great Britain and America," in which are contained the essential portions of two works by Stonehenge (J. R. Walsh), the great English authority on rural sports, and to this are added chapters by American authors, making one of the most complete, as it is one of the most beautiful, works on the dogs ever issued. Besides, this condensation allows the Publishers to furnish all that is of value in the two works for less than one-fourth of their original price. The illustrations are numerous and accurate, and the whole is produced in excellent style. For further particulars, see the publishers advertisement on another page. Price, post-paid, $2.

Cotton Seed Meal and Sugar Feed.—"C. L.," Tivoli, N. Y. Ground cotton-seed cake is a wholesome and safe food for fattening cattle or sheep, and for milk cows. It is a rich food, and at first should be used in small quantities gradually increasing up to 3 or 4 quarts daily. One quart a day is enough at first, and at the end of two weeks, a cow may receive 3 quarts safely; a fattening steer may have double this quantity. In feeding cows, the writer esteems it worth twice as much as corn meal, and good for milk and butter.

Farm Steam Engines—The Bookwalter—The makers of steam engines for farm use have made such improvements in compactness, simplicity, and efficiency, that with a number of them it seems hardly possible to improve any further in these directions. But there is one respect in which there is still room for improvement—the cost. It is often the case that the farmer who would be most benefited by the use of steam power, is the very one who can not afford to introduce it, the cost of the very cheapest engines now offered being more than farmers in moderate circumstances can well invest. We are glad to notice that one firm of engine makers has already made essential reductions in prices. The Bookwalter Engine, which was illustrated in the *American Agriculturist* in March, 1877, has, we are glad to learn, met with such an increasing sale that the proprietors have been obliged to enlarge their works, and their establishment at Springfield, O., covering several acres, is one of the most complete in the country. With increased facilities for production, the proprietors are enabled to reduce the cost of their engines, and they issue a special circular to this effect. As in all such cases, the advantages are reciprocal; the greater the number of engines sold, the cheaper they can be made, and the lower the price at which they are offered, the more will be sold.

Evener for 3 Horses Abreast.—"P. B.," Niles, sends a method of hitching 3 horses abreast to a plow as follows: "There are plows made here for three horses, with which the draft can be so regulated that one horse can walk in the furrow, and the plow will, as far as side draft is concerned, run itself. We use the three-horse evener shown in the accompanying sketch, and think it equal to any unpatented evener made. It consists of a bar of half-inch iron, two and a half inches

wide at the widest part, and tapering towards the ends. The center horse is attached to a hook placed at the top, and the outside horses are fastened to the bottom by an evener long enough to allow the center horse to walk between them easily." This is shown in the engraving.

The Hon. Marshall P. Wilder, in leaving the State House, Boston, made a mis-step and fell; it was found that the accident was more serious than was at first supposed, the head of the thigh bone being broken. This occurred late in March; a letter from an intimate friend of the Col. early in April says, that he "was comfortable, but of course with a man over 80 it is impossible to predict what the result may be." There are few persons in the country whose circle of acquaintances is so wide as that of Col. Wilder, and we are sure that he will receive from every quarter the warmest wishes for his speedy recovery. Notwithstanding his advanced age, we may hope for more favorable results in his case than we might in one who had less perfectly preserved his bodily and mental strength and vigor.

The Melbourne International Exhibition, Australia, not content with the exhibition at Sydney, this year, has provided for another in 1880, at Melbourne, Victoria. The programme at hand is very elaborate, but at present we need not say any more than that those wishing information may apply to "The Agent General for Victoria, 8 Victoria Chambers, Victoria Street, Westminster, London, S. W.," or to "the Secretary International Exhibition of 1880, Melbourne, Victoria, Australia."

Sundry Humbugs.

We wonder if the "Royal Gift Swarry" exhausted itself in the effort to "increase the sale of tickets," mentioned last month. While our April budget was largely made up of the circulars of this "Royal" swindle, this month our supply is confined to just two. One young man in Kansas apparently wishes to learn about the "Royal Gift Soiree" through personal experience, as he asks us to send him the address of its authorized agent! Excuse us, we are not in that line of advertising....Here is a fresh scheme, the "Kentucky Land Co.," which proposes to "distribute" residences, three-acre lots, farms, and fast four-in-hand teams in the most impartial manner. It asks us to

"PUT IN $5, DRAW OUT $225,000,"

and the whole affair reads very Pattee-ish....It is not surprising, perhaps, that parties receiving a notice that they have "drawn a gold watch and chain valued at $300," which will be forwarded upon the payment of $3, "to cover expenses, percentage, etc.," should think it possibly worth looking after. We have now half a dozen or more letters, in which the writers ask us to procure for them watches, jewelry, or other things said to have been drawn by them in some lottery. These must be from newer readers as our older friends know that

WE CAN NOT ATTEND TO THESE COMMISSIONS.

We have no time to waste on such errands. If the place given in the letter is found at all, it is more than likely to be a room at the top of some obscure building, with a hole in the door for letters. Should any one be found, the caller will be told that business is done only by mail, that the drawer of the prize has not complied with the conditions, which were to send $3 by mail or by express. Whatever else may happen, the one who calls will be very sure to get no "gold watch." For years past we have investigated this whole matter so thoroughly that we know that in all attempts to collect any of these claims one "has his labor for his pains."... We have to record a melancholy commercial disaster,

THE PARISIAN DIAMOND SHOP HAS BUST!

There was a shop where "diamonds" were sold, not vulgar African, nor yet Brazilian diamonds, but the real "Parisian Diamonds" of which we were told in the circular that the body was crystal, on which was deposited —by electricity of course—a coating of diamond!! Probably those who knew no better believed this impossible story. When it is known that the proprietor, though he called himself Humphreys, was really one of the Eliases (with Humphreys as a middle name), the diamond coating story will cease to be surprising.... Last month we gave some account of

THE DICTIONARY OFFER.

This appears to have broken out in several places, as persons in other small towns in Massachusetts, besides the one then named, as well as parties in Brooklyn and New York City, send out postals offering Dictionaries in terms almost verbatim alike. The offer implies that the Dictionary is worth $6, and is offered for 56 cents. We stated last month that it probably did not cost over 25 cents. In view of this, a bookseller in St. John, N. B., informs us that he sells the very same Dictionary (which is printed in Glasgow, Scotland), for 17 cts., post-paid.

NOW LOOK OUT FOR LIGHTNING RODDERS.

So soon as the roads become settled, there cometh the Lightning Rod Man, whose tongue after a winter's rest is ready to wag with more than usual glibness. It is well for every one to decide whether he wishes a lightning rod or not. If one is needed, buy the iron and put it up. If one is not needed, prepare yourself with

A BIG UNCOMPROMISING NO!

Don't argue with the lightning-rodder; if you do he will beat you, and you will buy his rod. There is only safety in a no! If he tells you how many were killed by lightning last summer, admibit; if he shows you how his double and twisted rod only is safe, and that a plain iron rod is worse than no rod, don't deny it. Get rid of him,

if possible, before he can frighten the women and children, by an account of their daily and hourly danger, and persuade them that without *his* rod, life is doubly uncertain. Rods put up by these travelling chaps are very sure to cost several times more than the unfortunate purchaser supposes they will, but more than this, the lightning-rod business is frequently made the medium of

MOST RASCALLY SWINDLING.

Every year we get several complaints, and one has already come from Nebraska, a brief account of which may put farmers and others on their guard. A young lady was killed by lightning in Boone Co. last summer, and this made that county a harvest field for the rodders. Last fall a chap, claiming to represent Reyburn, Hunter & Co., of Philadelphia, victimized a large number of the "hardworking, unsuspecting pioneers of Boone Co." The death of the young woman afforded the chap a strong point, and he did not want ready money, but would take notes to run from one to five years, with interest not to commence until June. As usual, there was a gang of them. He of the glib-tongue came and took the orders; then came men to put up the rods; then came another and took the notes. Here was the worst mistake of all.

"FARMERS BE CAREFUL WHAT YOU SIGN,"

the injunction which we have so often repeated, and shall have to repeat so many times hereafter, was forgotten, or at any rate, not heeded. The notes were signed, but the farmers were not "careful." They have been reminded of their want of care in a most positive manner. A lawyer in Marshalltown, Iowa, has notified the several signers that he has purchased their notes, and that they are due on the first day of next June! No such concern as Reyburn, Hunter & Co., is to be found in Philadelphia, and our correspondent asks what these givers of notes shall do. We do not know what is the law in the case, but we should advise all who have given these notes to unite and make common cause to resist the payment of them. If the facts are as stated, it should not be difficult to prove that they were

OBTAINED UNDER FALSE PRETENCES.

There is no doubt, justice to be had, if the Boone County people show a united front, but if each one is left to be threatened and frightened individually, without the support and sympathy of others, he will make the best of a bad bargain, and get out of it as well as he can. Our correspondent thinks that the publication of this case will "put people on their guard," and so it will, with a great many, but we are less sanguine in that respect than formerly. We have published, year after year, case after case, in which farmers have come to grief through want of care in signing their names; we have printed in small type and in large type:

"FARMERS, BE CAREFUL WHAT YOU SIGN!"

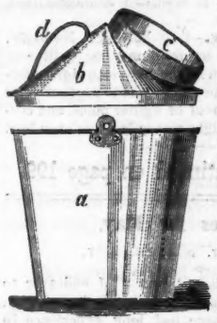
until the repetition has seemed irksome. Yet each year brings many new illustrations of the need of forcibly repeating the caution. It is not only Lightning-rod men who prey upon the farmer, but all sorts of devices are resorted to, to get somehow, by hook or by crook, the farmer's name.—He thinks he is merely giving his address, is showing the stranger how to spell it correctly, is giving an order for certain goods to be delivered at a future time, or in some other manner the name is obtained, and the next he hears of it is at the bottom of a note that some neighbor has bought, or the bank in the next town has discounted....An old swindle has been revived in some of the New England towns. It is to advertise for a party to act as agent for the sale of some quack medicine; in this case it was

"ROCKY MOUNTAIN BITTERS,"

but the agent must have a few hundred dollars to advance for an "interest in the business." The "Doctor" who represents himself as proprietor of the "Bitters," hires a store, sets mechanics to fitting it up in good style, and gets the money the agent is to pay; he gives the agent possession of the store, and goes off to send on the "Bitters." Agent waits, and if the "Rocky Mountain" sort does not come he has no lack of "bitters" of his own, in the shape of rent, and the bills of carpenters and painters to pay, and the bitter consciousness that the other chap has got his money.

Fairs for 1879.—Time and Place Wanted.—Several announcements of fairs and premium lists have already come to hand, and we make our usual request to the secretaries, or executive officers of the various societies, to inform us of the fair as soon as its date is determined. It may seem a strange request, but we ask them to be particular to name the *State*, in their announcements. A large share of the premium lists, show bills, etc., of county and smaller fairs fail to say in what State the fair will be held. As counties go, Washington, Jefferson, and some other counties, are far from definite. We would suggest to societies the importance of fixing upon the date early in the season and issuing the schedule of prizes; if this is left until within a few weeks of the fair, the work is often hurriedly done, and those who would compete for those premiums that require preparation in advance, are deprived of the opportunity for doing so.

An Improved Unpatented Milk Pail.—"J. P. M.," Alleghany Co., N. Y., sends the accompanying sketch of a milk-pail which he uses. It is an ordinary milk-pail (*a*), with a cover (*b*), made to fit the pail; the hight of the conical part should be one inch less than half the diameter. The cover has a round mouth (*c*); the hight of the collar (*c*), should be 1¼ inches or 2 inches, measured at the upper or lower side; the diameter may be made to suit the fancy; mine is 6 inches, being about ¼ inch less than the length of the side of cone, and is perfectly satisfactory. The collar should be wired around the top; at (*d*), is a handle. Tie a cloth strainer over the collar (*c*), letting it hang down 3 or 4 inches, put a sauce plate or small saucer in the strainer, and milk away. There won't be any specks on cream from that milk.



Jersey Red Hogs.—"H. W.," Newbern, N. C. We do not consider Jersey red hogs an improvement on the Berkshire, except as a means of producing lard or clear mess pork. For bacon or hams, they are very inferior to the Berkshire, which is the best for hams, shoulders, and bacon, of all the breeds we have.

A Cistern for 30 Head of Cattle.—"J. J. L.," Gallia Co., Ohio. To supply 30 cattle with water, a cistern should hold at least 300 barrels, which would be only a month's consumption, allowing 10 gallons a day for each animal, or 10 barrels in all for one day. 1,260 cubic feet capacity would be required, or a round cistern 12 feet in diameter, and 12 feet deep, with perpendicular sides, allowing the water to be 11 feet deep.

Irritation from Teething.—"L. J. W.," Davenport, Fla. Young horses, when changing their teeth, are frequently troubled with inflammation of the eyes. This cannot be prevented, but may be relieved by giving a dose of 8 ounces of Epsom salts to cool the system. It may be necessary to repeat this, and half an ounce of saltpeter given daily for three or four days may be helpful. It will do no good to knock out the animal's old teeth, as often advised, while it may possibly do harm.

Sharpening Mowing Machines.—That one invention begets another is strikingly illustrated in the case of mowers and reapers. The value of these important machines has been greatly enhanced by the invention of other machines for putting them in order. A dull mower is a disappointment, and a minor invention was needed to make the greater one complete. Machine knife-grinders of various styles have been produced; that known as the Farmer's Favorite Emery Grinder has received special commendations. The arrangements for holding the knife-bar and the mounting of the grinder are such that one person can operate it, and secure proper bevels and edges to the sections. It needs no argument to show that the durability of a mower, reaper, or harvester is largely dependent upon the ease with which the knives do their work, and blunt edges here mean wear and tear elsewhere. The makers of the Farmer's Favorite also offer a sharpener for lawn-mowers, for which similar excellence is claimed.

Bees and Fruit.—Every season we have letters asking how bees can be prevented from injuring grapes, peaches, and other fruit. There is no evidence that honey-bees do injure these fruits. The mouth parts of the bee are not strong enough to penetrate their tough skins. The most careful observations of such men as Langstroth, Quinby, Root, and others, have not found the honey-bee to be the aggressor. But when the skin of the fruit is once pierced by wasps, hornets, or birds, then the honey-bee comes for a share of the juices thus exposed; and while it is often the *receiver*, it is never the real thief—or rather burglar. This is a matter of great importance to fruit growers; but before they complain of the bee-keepers, let them examine the matter and see how far their losses are due to the honey-bee, and how far to their wild relatives, the various wasps and hornets.

Moles.—If any one has successfully exterminated moles by the use of any trap, will he please tell us what trap, and if a non-patented one, give us a sketch and description? If any have succeeded by using poison, will they tell us what poison, and how applied? Inquiries continue to come as to moles, and we would like to be able to give a satisfactory answer. We have not yet seen a trap that was worth more than its weight as old iron. Our only help is a cat; she is not patented, and is not for sale. She has not exterminated the moles, but has kept them in such subjection that they are not the pest that they were. We wish others' experience on the mole question, which is often an important one.

Lawn-Mowers—The Excelsior.—"G. W C." We would no more undertake to decide as to which is "the best" lawn-mower than we would indicate which is the best sewing-machine or field mowing-machine. There are several styles of all of these machines so nearly perfect that each one thinks the one he happens to have is the best. But after several years' experience with the Excelsior Lawn-Mower, we can commend it as thoroughly satisfactory in the character of the work and the ease of doing it. The large demand for the Excelsior abroad shows its superiority over the clumsy machines made in Europe, and we are informed that the foreign trade is increasing in a manner most gratifying to the makers.

The Winchester Repeating Fire Arms deserve the very high estimation in which they are held by experienced riflemen. We have used them on many hunting trips over the plains and through the parks of Colorado and Wyoming, and found them very accurate and reliable. They are specially valuable in hunting antelope at long or short range. We have frequently been able to discharge a dozen or more shots at a band before they could get out of reach. The heavy calibre Winchester brings down our largest game at long distances.

Cement Floor for a Stable.—"J. P.," Lagrange Co., Ind. A cement floor for a stable should be made strong. Concrete of stone and cement, well rammed down and soaked with hot gas tar would be best for a cow stable. A horse stable should be paved with cobble stones, well rammed down and filled in with cement worked in among the stones with a stiff broom. Gas tar will then make it water-proof and harden it.

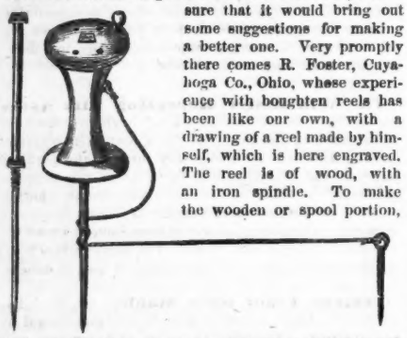
Cosmoline.—This, not as some have supposed, some secret compound, but is the trade name for one of the articles obtained from petroleum. Crude petroleum is a wonderful natural compound of a number of well marked substances, among which are the very light and exceeding inflammable liquids, gasoline, naphtha, etc., a heavier liquid which we know as kerosene, still heavier oils, and finally some solid substances, one of which, much like wax, is called paraffin. Of late the medicinal qualities and the uses in pharmacy of these petroleum products have been investigated, especially in Europe. So far as the solid products go, paraffin and similar substances, their resistance to all change when exposed to the air makes them especially suitable to external applications, and they probably will supersede the various animal and vegetable fats now used in ointments. Cosmoline is the trade name for one of the nearly solid petroleum compounds, as kerosene is for one of the liquids. The use of this and similar preparations derived from petroleum, is commended in a recent "Medical and Surgical Reporter," and those of our associates who have used it speak in high terms of its efficacy as an external application to raw surfaces, burns, and wherever a soothing ointment is desirable.

To Prevent Wheat Lodging on Mucky Soil.—"A. J. A.," Goodhue Co., Minn. Lime may be usefully applied upon mucky soils to prevent wheat lodging. Wood ashes are useful on such soils.

The Shaker Separator and Engine.—We are so accustomed to associate the name of Blymyer with sugar and syrup machinery that it seems rather strange to receive from the Blymyer Manufacturing Co. a neat and handsomely illustrated pamphlet, that says nothing about sugar or any other form of sweetness, but is solely devoted to the merits of the Shaker Separator, and the motive powers for working it. It may be necessary to tell some old-fashioned farmers that a "separator" is a threshing-machine; the use of that name is now becoming very general, and has the advantage, if no other, of making one word serve instead of two. From the well-known thoroughness of the Blymyer Co. in other manufactures, we have no doubt of the excellence of the Shaker Separator. The machine as compared with the old style of thresher appears ridiculously small, yet when we are assured that it will thresh and clean from 20 to 50 bushels of wheat, according to the power used, in an hour, it is evidently large enough. The makers claim to have produced a machine which can be sold at a price that will allow a farmer to have his own thresher, and of a size that can be worked in the barn, enabling him to thresh his grain when convenient. Horse powers of different styles are made by the Company, who also make the "Queen City," a portable farm steam-engine, which we described and figured in October, 1877.

The Currant Fruit Worm.—"G. S.," Oakville, Ont. The insect figured in March last is no doubt the same as the one you have found so destructive to "the wild gooseberries in the backwoods of Canada." There are many cases in which insects heretofore known only on wild plants have become, by the advance of settlements, introduced to cultivated plants, and there, meeting with an abundant supply of food, have increased with such rapidity as to bring them into notice. Should your insect that so generally injures the fruit of the wild gooseberry, prove to be different from the one figured, we shall be glad to know it and to receive specimens.

A Good Garden Reel.—It very rarely happens that we state a want but some reader kindly supplies it. When in the "Notes About Work," in the Kitchen and Market Garden, we mentioned the general frailty and worthlessness of the garden reels offered for sale, we felt sure that it would bring out some suggestions for making a better one. Very promptly there comes R. Foster, Cuyahoga Co., Ohio, whose experience with boughten reels has been like our own, with a drawing of a reel made by himself, which is here engraved. The reel is of wood, with an iron spindle. To make the wooden or spool portion,



the central shaft is worked with a shave, or, better turned in a lathe from a piece of wood 9 inches long; the end pieces, 6 inches in diameter, are of inch board, and firmly fastened to each end of the shaft. The central iron is two feet long and of ⅝ iron; this, as shown at one side, has a head at the top, and 11 inches from this end has a thread cut and furnished with a nut; a hole of the proper size is bored through the reel to receive this iron, and the nut is put on to hold it in place. The lower end of this iron is pointed, to enter the ground easily, and a sharp-pointed pin, with an eye, is provided for the other end of the line. Mr. F. says that a reel of this size will hold 300 feet of ordinary garden line, and having a broad surface to push upon, is easily pressed into hard ground. When sufficient line has been run out, it is stopped by taking a few turns around the iron rod.

Premiums at Fairs.—In a large number of cases it is not the money value of the premium that gratifies the recipient; it is the fact that a premium was given at all. Now that Fair schedules are being—or should be—considered, and published, we would suggest to those having the matter in charge, that a number of societies offer as premiums a year's subscription to the *American Agriculturist*, and also *Agricultural and Rural Books*, and that those which have done this in a small way at first, have found it so satisfactory that they have added to the number of premiums of this kind and that this custom is increasing. Such premiums do vastly more to promote the objects of the society than mere money prizes. Aside from the fact that one can not fail to be greatly benefited by the teachings of the *American Agriculturist*, its regular coming once a month, is a frequent reminder of the Society and its Fair, and thus the interest of the recipient of the prize in the fair at which it was given, is kept alive the whole year. The case is similar with well chosen books, which will be frequently consulted. If the officers who have yet to arrange their premium lists will think of this matter, they will see that they can in no other way make the money at their disposal go so far, and at the same time do so much good, as to award a large share of it in the manner here suggested. In arranging the premiums it should not be forgotten that the household as well as the farm proper is to be thought of. There is hardly a house-keeper who would not prefer to have the dollar or two awarded for the best bread or other household achievement, in the form of one of Miss Corson's works on cookery, or in some other similarly useful work on household matters. The Publishers are ready to make special terms for the *American Agriculturist* or for books to be used for premiums.

Whitman's Fountain Pump.—As a portable apparatus for throwing water by hand the Fountain Pump combines many excellencies. It is remarkably compact, neat, and ingenious in construction, and so simple that it can hardly get out of order. It is worked with great ease, and for the size, throws a large quantity of water or other liquid. For all horticultural purposes, not only for watering, but for applying various washes and insect poisons to plants and trees, whether in-doors or out, it has become a standard article, as we find it in the catalogues of the leading dealers of the country. As a fire extinguisher, ready for use in an emergency, and enabling one to place water where it is needed, it has proved its efficiency on several occasions. An acquaintance of several years with the Fountain Pump—fortunately for every other use than the last mentioned—allows us to speak of it in terms of commendation.

Barracks for Hay.—"R. W. W.," Nashville, Tenn. Barracks for hay or grain may be built very cheaply. A plan was given in the *American Agriculturist* for July, 1878. A cheaper method is to use four poles set in the ground, make a roof of lighter poles, and cover it with thatch. This might cost only $5, or even less.

Basket Items continued on page 199.

Bee Notes for May.

BY L. C. ROOT, MOHAWK, N. Y.

In the preparation of these "Notes," I endeavor to make them very simple and practical. It is, however, difficult for those who have had long experience in any particular pursuit, to realize that its details are not as familiar to all others, as to themselves; and I may sometimes omit some minor points, or fail to be minute enough in my directions to meet the wants of all. Hence, I shall be glad to reply to any questions on omitted points that may be addressed to me.

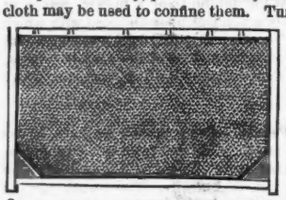
There are thousands of people who might, if so disposed, secure the honey that is wasting at their doors, by keeping a colony or two of bees, and I would show how this may be done with little expense. It is, of course, impossible within the limits here allowed, to give more than the most simple directions. Every person who proposes to keep even a single swarm of bees, should have a good practical work on the subject. Bee-keeping is no longer a question of "luck," but is an art governed by fixed rules, and must be studied as such, to be successful. In February and April, I have endeavored to make clear the requisites as regards hives and boxes, and to give minute directions for preparing them.

PURCHASING BEES.

The next point is, to secure the bees with which to commence. The present month is unquestionably the best time in northern latitudes to purchase bees. It is my custom to buy just before apple blossoms appear, and move the hives at once; if they are to be transferred from box-hives to movable frame hives, this is the time to do it. For many reasons it would be better for most beginners to procure their bees already in movable comb hives, and in proper condition to take advantage of the flow of honey which will soon follow. If the buyer has had sufficient practice, or has familiarized himself with the necessary process, transferring the bees from box-hives to those with movable frames may be done according to directions given in the *American Agriculturist* for May, 1876.

MOVING BEES.

If bees are to be moved but a short distance, and in the cool part of the day, pieces of sleazy muslin, or any thin cloth may be used to confine them. Turn the hive bottom up, and tack the cloth over, folding it firmly at each corner. If they are to be moved longer distances, wire-cloth must be used instead. If the weather is very warm, the wire-cloth should be bulged in such a manner that the bees may come above the combs and receive more air. Do not think you cannot keep bees, because you cannot buy them in your immediate vicinity. I have successfully moved hives for 50 miles in an ordinary spring wagon, and hundreds of miles by rail in a common freight car. A year or two ago I shipped a colony from my apiary to Santa Fe, New Mexico. The last 400 miles, or more, it was carried on a freight wagon, and yet it arrived in perfect condition.



2.—FRAME OF COMB FOUNDATION.

COMB FOUNDATION.

If bees are to be transferred from box hives to movable frames, and all drone comb rejected (as it should be), there will not be worker comb enough to fill all the frames. Such deficiencies should be supplied by placing sheets of Worker-comb Foundation in the empty frames. This will obviate the danger of the frames being filled with drone-comb by the bees. I had hoped to give a full description of this new invention of Artificial Comb Foundation, and the manner in which it is prepared, but circumstances have prevented. I will simply say that it is constructed from the wax made from waste pieces of comb. The wax is formed into thin sheets, and passed between rollers which give it the exact form of the base of worker combs with starters—*i. e.*, the side walls of the cells already started by a slight ridge of wax. Fig. 1 shows the machine for making comb foundation, and fig. 2, a card of it, fastened in the frame. Its advantages are many, the principal one being the ability to secure straight and perfect worker combs.

Instead of using boxes, many will desire to secure their surplus honey in a liquid form, using for the purpose the honey extractor, with which the honey may be thrown from the combs, after which these may be returned to the hives for refilling. Directions for extracting will be found in the *American Agriculturist*, for June, 1876. These comb foundations will be found useful in filling extra frames for this purpose.

STANDS AND ROOFS.

It is best that the stands for bees should be near the ground, and in a place as much sheltered from the wind as the surroundings will permit. For a stand, I prefer two pieces of 4×4 scantling, laid directly upon the ground, and the hive set upon them. While this is the most desirable situation, bees may be kept, if circumstances require, in any attic or out-building by arranging a proper entrance to the hive. Or, as is often practised in cities or large towns, they may be placed upon the roof of a building. Each hive should have a good roof to protect it from the weather, unless when set under shelter as above mentioned. A good illustration of a suitable roof may be found in the Notes for January, 1877.

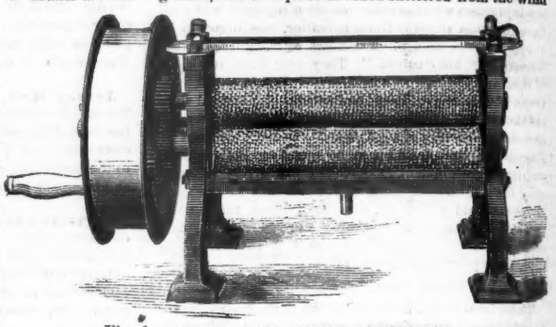


Fig. 1.—MACHINE FOR MAKING FOUNDATION.

The Corn Crop—Fertilizers.

May is the great planting month in much the largest portion of the chief corn-growing regions. At the South, the work is mainly over; in the Northern border States and British Territories, a good deal of planting will be done in June. We give considerable space in the present paper to this particular crop, which is one of the important agricultural products of our country, and particularly to the questions of fertilizers.—On pages 183-4 are some notes from recent analyses. A careful study and comparison of the figures will supply curious and interesting, as well as somewhat instructive, suggestions as to the relative feeding values of different varieties of corn.

Within a few years a greatly increased interest has sprung up in some of the older States, and especially in New England, in regard to the corn crop; and the tendency now is to a belief that, taking into account freight from the West, the introduction of improved fertilizers, the condition of the soil, and the relative values and yields of other crops, Eastern farmers can compete with Western farmers better in raising corn than in any other leading crop. It is argued, that by the judicious use of the right fertilizers, the yield per acre is so increased at a moderate cost for the fertilizers, that in many, if not in most cases, the Eastern farmer can now raise, and put in his own bin, a bushel of corn cheaper than he can buy it from the West, after paying freight and other charges.

CORN FERTILIZERS—WHAT EXPERIMENTERS SAY.

Last year we proposed a series of definite experiments with fertilizers, somewhat like those of this year. These were tried on corn by numerous care-

ful farmers, from Maine to North Carolina, on a variety of soils, good, bad, and indifferent, but mostly poor. Prof. Atwater has given, in March, page 91, and in this number, this page, some of the results. We will summarize here for the general reader, a few of the apparent lessons derived, but recommend a careful study of Prof. A.'s articles and tables.

On the average, the largest increase in the yield of corn, 48½ bushels, was obtained from using the "complete" chemical fertilizers, applied at the rate of $15.38 per acre (including $5 per ton added for freight and handling the fertilizers). The next best average yield was with farm manures, viz., 46 bushels per acre. But the most *profitable* yield was from those chemical fertilizers which supplied phosphoric acid and potash, with no nitrogen added, viz., 300 lbs. superphosphate (dissolved burned bones) with 200 lbs. muriate of potash. Cost of the two, $8.75.* Yield of corn from their use, 43 bushels of shelled corn. (Cost of corn, a trifle over 20 cents per bushel, deducting nothing for increased value of stalks—the labor of planting and tillage being about the same as for a small crop.)—In a few cases 150 lbs. of muriate of potash produced quite as good results. Sharp buyers can probably obtain 300 lbs. of first quality superphosphate, and 150 lbs. muriate of potash, for about $7.25. If this mixture averaged as above, viz., 43 bushels shelled corn, the cost would be under 17 cents per bushel. In these estimates we charge the whole cost of the fertilizer to the first crop of corn, allowing nothing for the after effects, which is of no small account.

It should be borne in mind that the above fertilizers enable the corn to gather a good deal of nitrogen; that when the corn is fed at home a large part of this nitrogen goes back into the soil in the form of manure, to enrich it for other crops; that this will often nearly, or quite repay the cost of the fertilizers, and that if cotton-seed meal, linseed cake, palm-nut meal, or bran, be fed with the corn, they will not only supply the nitrogen that the cornstalks lack to make them excellent fodder, but will also make rich manure at small cost to bring up the farm to high fertility. These are matters well worthy the careful consideration of every thoughtful farmer.

In stating the above *general* results of the experiments, it is to be added, that in many cases potash salts did not pay; in a few, superphosphate did not pay; while nitrogen in nitrate of soda, or sulphate of ammonia, or other forms, rarely repaid its cost. Some one fertilizer paid best in one case, and another in another. Some soils are too wet, or too dry, too loose, or too compact, to make any fair returns; but on soils capable of doing anything with manure, with at all favorable weather, the fertilizer that fitted the particular soils and their condition, brought very large profits—from two to ten-fold the cost of the fertilizers applied; and this in the first crop, allowing nothing for future benefit to both soil and manure. *One aim of our proposed experiments this year is to try to find out, as far as possible,* WHAT *fertilizers do fit particular soils.*

The upshot of the whole matter is just here: In the older States, and wherever the soils are depreciated by cropping, and especially where they are pretty well worn out, artificial fertilizers are indispensable, in the absence of abundant farm manures, and the ones that fit the demands of the soil and crop, must be profitable as a rule.

Taking the experiments as a guide, while the mixture of superphosphate with potash salts generally gives the most profitable returns for their cost, if one wishes the largest possible yield per acre, it may be well to put with the phosphoric acid and potash, some nitrogen in the form of nitrate of soda, or better, perhaps, in the form of good Peruvian guano—using per acre one of the following:

300 lbs. superphosphate, 200 lbs. muriate of potash, 150 lbs. nitrate of soda.	or, 200 lbs. superphosphate, 150 lbs. muriate of potash, 300 lbs. Lobos guano.
or, 250 lbs. superphosphate, 150 lbs. muriate of potash, 200 lbs. Standard Peruvian guano.	

The amount of each of these fertilizers required per acre, may be less or more than the above, according as the soil is in good condition, or very poor. The fertilizers are supposed to be finely ground, well mixed, spread broad-cast, and harrowed in before planting. One half of these may be so applied, and the other half be *scattered* thinly in the hill at planting, and covered with a little earth so as not to come in contact with the tender young roots, and thus injure their growth.

* Superphosphate (dissolved bone black) costs $30 to $35 per ton—Muriate of Potash, ("80 per cent") $35 per ton.

300 lbs. Superphosphate, at $35 per ton....$5.25 } $8.75
200 lbs. Muriate of Potash, at $35 per ton.. 3.50 }

Or.

300 lbs. Superphosphate, at $30 per ton....$4.50 } $7.13
150 lbs. Muriate of Potash, at $35 per ton..2.63 }

Science Applied to Farming, LI.

Fertilizers for Corn.—Lessons from the Field Experiments.

In his excellent new book, "Talks on Manures," Mr. Harris, says, "We know less about the manurial requirements of Indian Corn than almost any other crop we cultivate." The main question is the nitrogen supply—whether, like other cereals (wheat, barley, oats, grasses, etc.), corn has but little power to get nitrogen from natural sources, and requires nitrogenous fertilizers; or, whether, like leguminous plants (clover, beans, peas, etc.), corn can gather the nitrogen for itself; that is, whether corn is, like wheat, an exhausting crop, or like clover, a renovating crop. Mr. Harris is rather inclined to class it with the cereals, but mentions some facts which indicate that in feeding capacity it is more like the leguminous plants. If the latter is the case, then Indian corn grown and consumed on the farm, will, "like clover, enrich the land...the corn will gather up the nitrogen that the wheat crop cannot appropriate, and when the corn and stalks are fed, some 90 per cent of the nitrogen will be left in the manure."

Mr. Lawes has written a letter to the Secretary of the New Jersey Board of Agriculture, and also another letter to Mr. Harris, discussing this same question, and insisting, as Mr. Harris also does, upon the need of experiments to test it. He says, "It is of very great importance to know to what extent Indian corn follows the same law [as the cereals]; that is to say, on a soil which, under a liberal supply of potash and phosphoric acid, will yield 20, 30, or 40 bushels of corn, what increase is obtained by a liberal supply of ammonia or nitrates?" Mr. Lawes is inclined to class corn with the cereals, though he would expect that with mineral fertilizers it would, during its longer period of growth, get more food from soil and air, and, especially, more nitrogen, and give a larger produce than wheat.

Formulas for Corn Fertilizers.

In a letter to the Treasurer of the Massachusetts Society for Promoting Agriculture *, Mr. Lawes, says, "The best possible manure for all the graminaceous crops—wheat, barley, maize, oats, sugar-cane, rice, pasture grass—is a mixture of superphosphate of lime and nitrate of soda....Potash is generally found in sufficient quantities in soils, and the artificial supply is not required."

The Ville Formula for Corn.

Ville urges what he calls "complete fertilizers" containing nitrogen, phosphoric acid, potash and sulphate of lime, and he regulates the proportions by the assumed power of the plant to get its food from soil and air, and the special effects of the different fertilizing substances upon it. He classes corn with sugar-cane, sorghum, turnips, rutabagas and artichokes; for which he makes phosphoric acid the "dominant" or most efficient ingredient. Below is his formula for an acre of corn with the amounts of valuable ingredients and their cost in the forms he recommends. The last column gives the cost in equally good but cheaper materials, like nitrate of soda, guano, bone and potash salts, which, with many important facts in agricultural chemistry, his system curiously ignores.

* Bulletin of the Bussey Institution, I, 181. From later writings of Mr. Lawes, I think he would not insist upon the universal application of the above remarks concerning potash.

The Stockbridge Formula for Corn.

Professor Stockbridge's formulas are calculated to furnish the amounts of nitrogen, phosphoric acid and potash which the crop is found by analysis, on the average to contain. Thus he recommends for Indian corn:* "To produce 50 bushels of the grain, and its natural proportion of stover to the acre, more than the natural yield of the soil; and in like proportions for other quantities, use"—the formula below. To the formula I append cost of materials as recommended by Prof. Stockbridge, and the cost of same ingredients in cheaper forms, basing estimates, here, as elsewhere, upon current market rates, with $5 per ton added for freight and handling. To resume then, we have the following:

Fertilizers For Corn.

MR. LAWES.

"Best Possible Manure." "Mixture of Superphosphate and Nitrate of Soda."

VILLE FORMULA.

Materials per acre.	*Ingredients.*	cost. *In formula.*	*In cheapest form.*
Nitrate of potash, 190 lbs.	Nitrogen, 24 lbs	$ 9.30	$ 4.80
Acid phosphate of lime..... 540 lbs.	Phos. Acid, 81 lbs.	9.45	9.45
	Potash, 79 lbs.....	7.00	3.56
Sulphate of lime, 360 lbs.		1.44	1.44
		$27.09	$19.25

STOCKBRIDGE FORMULA

"To produce 50 bushels above the natural yield of the soil."

Materials per acre.	*Ingredients.*	cost. *In formula.*	*In cheapest form.*
Sulph. of ammonia, 320 lbs.	Nitrogen, 64 lbs...	$15.20	$12 80
Superphosphate... 248 lbs.	Phos. acid, 81 lbs..	4.84	4.84
Muriate of potash, 154 lbs.	Potash, 77 lbs.....	3.46	3.46
		$23.00	$20.60

The Ville and Stockbridge formulas differ from Mr. Lawes' recipe in supplying potash. Ville adds plaster also.—Prof. Stockbridge differs from Ville, in that he, (1), ignores the plant's feeding capacity and the specific effects of the different materials upon it; (2), considers only the composition; (3), accordingly gives nitrogen the dominant place instead of phosphoric acid—putting little of the latter in his formula, but so much nitrogen as to make its cost over three-fifths of the whole; (4), omits the plaster.

What our Experimenters Have to Say?

The men who made the experiments last season have furnished us more light by far, on some of these points, than I have been able to find in all the data to which I can get access, from this country and from Europe. A brief outline of the results of 27 trials on corn—with nitrate of soda, superphosphate, and potash salts, each alone, two by two, and all three together, on various soils, some very good, others fair, and more very poor, in good weather and bad, from Maine to North Carolina—was given in the March article, page 91. The effects of the individual ingredients, as shown by the averages for each experiment of the increased yields on the several plots were, in brief, as follows:†

Phosphoric acid in 8 experiments was decidedly the regulating ingredient—the crops responding uniformly to the superphosphate, and paying comparatively little attention to the other materials. In 14 experiments it took a less important, but still prominent place. In 5 experiments it produced little or no effect, the average increase with the superphosphate on the several plots being, in each case, less than 4 bushels per acre.

Potash in 4 experiments, held decidedly the dominant position; in 14 others the potash salts were more or less efficient, in 9 the increase with them was less than 4 bushels per acre.

Nitrogen took, in no experiment, the regulating place. In 16 the nitrate of soda was more or less useful; in 11 the increase fell below 4 bu. per acre.

The phosphoric acid and potash together, No. V., (No. F, of this year's set), costing at the rate of $9.75 per acre, brought a larger yield than either of the two with nitrogen—the average with these "mixed minerals" being 43 bushels per acre. This was the most profitable fertilizer of all. The complete fertilizers, No. VI., (G of this year), containing all three, and costing $15.38 per acre, brought the largest average yield, 48¼ bushels per acre, and

* Report of the Mass. Agriculture College, 1876, p. 35.

†The experimental fertilizers, "Set A" and "No. XIII.," of last year, were the same as "No. 3" this year.

thus excelled the farm manures, which were variable in amount and quality, but brought on the average 46 bushels. The variations with the same fertilizer in different experiments were very wide.

Does Corn Demand Nitrogenous Fertilizers?

In the above experiments, Corn (1) responded less to the nitrogen than to either of the other elements; (2) did well with the mineral mixture, No. F, and (3) was but little helped by the addition of nitrate of soda in No. G. All of these facts imply that corn can do a good deal toward gathering its own nitrogen from the soil, and perhaps from the air. To test this question more thoroughly, a special series of experiments were undertaken by Prof. Farrington, of the Maine Agricultural College, and Messrs. Bartholemew and Sage, of Connecticut. Eighteen different fertilizing mixtures were used, each on one-tenth of an acre. The first eight were essentially the same as Set No. 3 of this year, except that the muriate of potash was reduced to 150 lbs. per acre. The amounts of phosphoric acid and potash were about such as occur in a crop of 50 to 56 bushels per acre. The nitrogen was applied in successive portions of 24, 48, and 72 lbs.. or one-third, two-thirds, and the whole amount found in the same crop. The nitrogen was supplied in different forms, in nitrate of soda, in sulphate of ammonia, in dried blood, in a mixture of all three, and in Peruvian guano. As regards the effects of nitrogen in different forms, the Peruvian guano brought the largest increase; the mixture of nitrate of soda, sulphate of ammonia, and dried blood next; then followed in order of valuable effects produced: nitrate of soda, sulphate of ammonia, and last and worst of all, dried blood. The guano appears at a somewhat unfair advantage, however, because it had rather more phosphoric acid than the other mixtures, but this consideration is partly counterbalanced by its low cost. Estimating a bushel of corn, with its stalks and roots, to contain 1¼ lbs. nitrogen, and to be worth 80 cents, the effects of the nitrogenous fertilizers in all the experiments, general and special, may be summarized as follows, remembering that the superphosphate and potash salt, "mixed minerals," supplied the amounts of phosphoric acid and potash in a crop of 50 to 56 bushels, which would also contain about 72 lbs. of nitrogen:

With	*The Crop Averaged*	*and*	*Contained*
Mixed Minerals alone.	42.9 bushels.		57.2 lbs. Nitrogen.
Mixed Minerals, plus 24 lbs. Nitrogen.....	48.3 bushels.		65.0 lbs. Nitrogen.
Mixed Minerals. plus 48 lbs. Nitrogen.....	50.5 bushels.		67.3 lbs. Nitrogen.
Mixed Minerals, plus 72 lbs. Nitrogen.....	52.2 bushels.		69.9 lbs. Nitrogen.

The crop was but little helped by nitrogen in the fertilizers, and evidently gathered a good deal from natural sources. This appears more clearly if we look at it another way:

In number of trials.	*With Nitrogen.* *Amount per acre.*	*Contained in Crop of*	*The average increase of Corn was*	*The increase of nitrogen in the crop was*
29	24 lbs.	18 bushels.	5.9 bushels.	7.9 lbs.
15	48 lbs.	36 bushels.	7.6 bushels.	9.1 lbs.
9	72 lbs.	54 bushels.	9.3 bushels.	12.4 lbs.

Or, from the pecuniary standpoint:

In Trials. Total number.	*With Nitrogen. Amounts.*	*Costing.*	*The Nitrogen paid for itself in trials.*	*failed to pay for itself in trials.*	*The average loss in the several trials was.*
29	24 lbs.	$5.50	8	21	$0.90
15	48 lbs.	11.00	1	14	4.45
9	72 lbs.	16.50	0	9	8.51

The nitrogen increased the crop enough to cover its cost in 9 trials out of 53. The pecuniary loss was greater in proportion as more of the nitrogen was used. With mineral fertilizers alone, the crop gathered by the above estimate, on the average, 57 lbs. of nitrogen per acre. If the corn were fed out on the farm, the bulk of the nitrogen would go into the manure—according to Mr. Harris' estimate, with careful husbanding, nine-tenths. Allowing only three-fourths to be saved and used, the amount of nitrogen thus returned to the soil would at ordinary market rates cost as much as the fertilizer used for the crop.

I am too well aware of the defects of this system of experimenting, and of the danger of basing conclusions upon insufficient data, to attempt to formulate any positive theories from these experiments. It may not be amiss, however, to note some of the ways in which the experiments agree or disagree with the doctrines referred to above.

The Best Fertilizers for Corn

depend, first of all, upon soil and season. Leaving these out of account, and judging from the experiments: (1) We should expect the largest crops with a mixture of superphosphate, potash salts, and nitrate of soda; or better, with nitrate of soda, sulphate of ammonia, and dried blood, instead of nitrate of soda alone; or, perhaps, better still, when the cost of the materials is taken into account, with a mixture of Peruvian guano and potash salts. If the higher "10 per cent ammonia" grades of guano is used, it would be well to put in some superphosphate or dissolved bone to increase the phosphoric acid. With the lower grades, containing 4 to 6 per cent of ammonia, and 15 to 18 per cent of phosphoric acid, muriate of potash would suffice. (2) The mixture of 300 lbs. superphosphate, and 150 lbs. muriate of potash, was the most profitable one used. This, at 1¾ cents per lb., for superphosphate, and the same for the potash salt, would cost $7.87½, a low price for a fertilizer for an acre of corn.

The superphosphate brought paying returns in about three-fourths of the experiments, the potash salts in one-half, and the nitrogen none, except a few cases where the smallest quantities were applied.

The Experiments and Mr. Lawes' Recipe.

The mixture of superphosphate and nitrate of soda, recommended by Mr. Lawes, often did well, and often failed. It was rendered safer by the addition of the potash salts, and more profitable by omission of the nitrate of soda.

The Experiments and the Ville Formula.

Phosphoric acid, which Ville makes the "dominant" for corn, was often, and potash occasionally, the most effective ingredient. It is a question how often so much of superphosphate or of plaster as Ville recommends would be profitable. The idea of supplying nitrogen and potash in so costly a form as saltpeter is economically absurd.

The Experiments and the Stockbridge Formula.

In circumstances like those of the experiments, the phosphoric acid in the Stockbridge formula would be sometimes, the potash often, and the nitrogen generally, used at a loss. So little phosphoric acid as the formula provides would be ill advised, and so much nitrogen wasteful in the extreme.

Formulas in General.

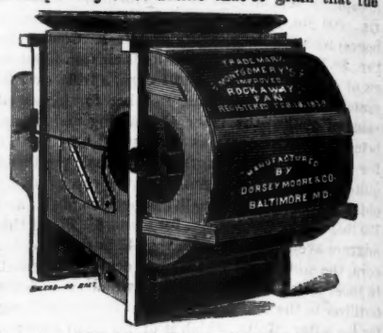
Finally the experiments illustrate two important truths:—1. A formula for any crop, to fit all cases economically, is simply out of the question, and must remain so as long as soils and seasons continue to differ. 2. With the right materials in the right places, chemical farming is profitable business.

Still, when a man does not know what his soil and crop need, it may often be better policy to buy "complete" fertilizers and pay the penalty of lack of knowledge in the purchase of superfluous material than risk the loss of his crop. Formulas are irrational, but they mark the first step in the progress toward rational manuring. W. O. ATWATER,

Wesleyan University, Middletown, Conn.

The Rockaway Grain-Fan.

A good fan is a good thing. By thorough work it can add to the price of each bushel of grain sent to market, and what is of quite as much importance, it can (like the boy Franklin's "grace over the whole barrel of pork"), so clean the seed-grain that there will be very few weed-seeds to be removed from the harvested crop. Nearly every farmer complains of the weeds, but few are aware of the extent to which they sow the seeds of these very weeds. In March of last year, page 108, we showed engravings of no less than ten different seeds of weeds that may be, and frequently are, sown with clover. It is the same with other seeds, and in putting in grain that has not been properly cleaned, the farmer cultivates the weeds just as much as he does his wheat or barley. We have before referred to the excellence of the "Rockaway," and a pretty thorough experience with it the past season, allows us to repeat with emphasis what has been said in its favor. The engraving of the Rockaway Fan shows one of its peculiarities—its compactness, a point second only to the excellence of its interior arrangement. This fan is by no means a new machine, as it has been before the public for over twenty-five years, and the number of successive premiums it has taken at fairs show that in whatever improvements may be made in fans, the Rockaway has kept pace with the best, and the list of its successes at fairs is one that the makers of any machine may be proud of. The test of excellence in a fan is its ability to separate seeds that are closely alike in size. A weed-seed, while its shape may be so unlike that of grain that the



THE ROCKAWAY GRAIN FAN.

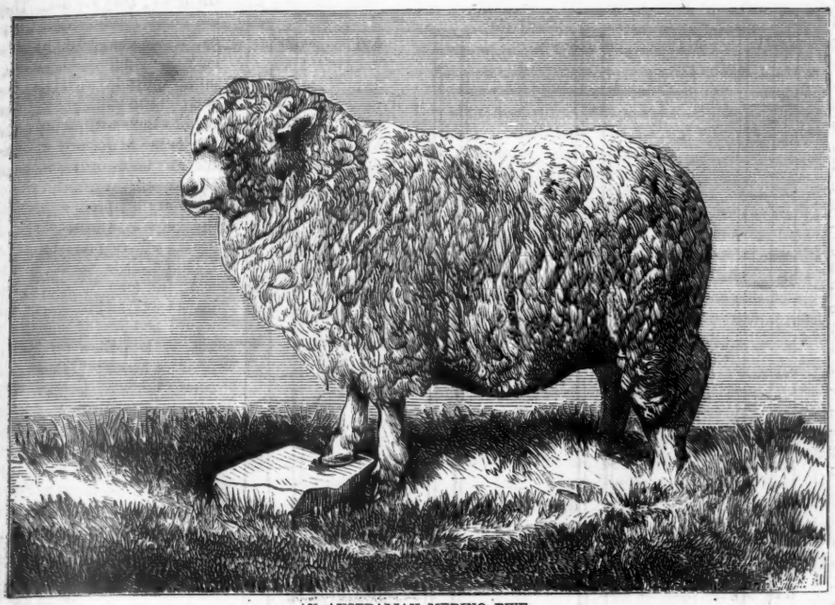
two may present a very different appearance, may, nevertheless, be of so nearly the same diameter as to make it very difficult to separate the two. This is the case with the seed of the "Partridge Pea," the seed of a plant (*Cassia Chamæcrista*) so abundant in Virginia and southward, as to be the chief pest of the wheat-growers. To separate this seed from the wheat is regarded as the severest possible test for a fan, and the makers of the Rockaway put forth its ability to do this as one of its highest excellencies. Rapidity and ease of motion are here joined with thoroughness in work.

Steam Engines for Farm Use.

If one has occasion to select an engine for agricultural purposes, he will be surprised at the great variety of style and make there is to choose from. Some establishments make only stationary, others only portable engines while many supply both kinds. Though the manufacture is a comparatively recent one, it is already a very important branch of industry, and the improvements in the direction of simplicity and safety are frequent and important. Among the oldest engines for farm use in this country are those made by the Watertown (N. Y.) Steam Engine Co. So long ago as 1850 the predecessors of the present company received the medal of the New York State Agricultural Society, since which time the establishment has continued to increase its works and to improve its engines, both stationary and portable. Among the points of superiority claimed for this portable engine are: The engine is placed upon a substantial bed that relieves the boiler of all strain while it is working, and allows the engine to be removed and placed on a separate foundation if desired. The cylinder is so protected as to check condensation of steam within it, and to prevent loss of heat. The engine is so placed and connected that all side strain is avoided. The peculiar style of governor used upon these engines, while of the simplest construction, is claimed to be superior to every other device of the kind, and to allow of an immediate adaptation of the speed to the work; a similar superiority over the common form is also claimed for the safety valve used upon these engines. The stationary engines made by this company are furnished with all of the above-named improvements, and the boiler is constructed with special regard to safety. These are largely used for creameries, cheese factories, etc.; they are especially adapted to farm and plantation uses as well as to furnish power for small manufactories.

Australian Merino Sheep.

The pastoral industry of Australia was well established, and had attained to great importance half a century ago. Before the discovery of gold, about 30 years ago, the commerce of that immense island consisted mainly in exporting the wool furnished by the enormous flocks of sheep. Next in importance as an article of export, was the tallow, obtained from the carcasses of the sheep, which being useless for any other purpose, were boiled down to supply tallow for European consumption. In this rude pastoral life, the settlers upon the dry and grassy plains of that country slowly but surely gained a competence, and after a term of what they considered voluntary banishment, they returned to their homes in England. The discovery of gold changed the whole order of Australian life. Where the hoof of the sheep had trod, the soil actually turned to gold, realizing literally the fancy of the poet. For it was on a "sheep run" that the first nugget, a monstrous one valued at over $20,000, was found quietly reposing on the bare ground. Previous to the golden-age, when a "run" or pasture tract, or rather the right to use it, was sold to a new arrival, and the old owner returned home with his savings, the flocks upon the land were usually "thrown in," as at that time a sheep was valued at only 25 cents. After the discovery of gold sheep become worth $2 or $3 each, and the ground over which the flocks had roamed, was leased to miners; these turned over, washed, gullied and burrowed into it, and spoiled it for pastoral purposes. The sheep interest, however, rapidly developed in new fields, and this development in part consisted in the improvement of the races of sheep. The climate being hot and dry, with a winter consisting only of a season of rains, and much similar to that of California, the Merino became the popular breed, and more especially as fine clothing wool was the most salable in the English market, to which the fleeces were sent. By importing the finest rams from Europe, chiefly from France, the Australian Merino was greatly improved, but it was only when some American rams were brought to that country that it was discovered that Australian Merinos were excelled by the American. This superiority was no mean credit to our breeders, who had long abandoned the importation of foreign blood, and for many years had steadily improved their flocks from within, with no aid from without, while the Australian shepherds had secured the best rams from the most noted French, German, and Spanish flocks. The character of the Australian Merino is much the same as that of the American, except that the latter is now running to longer wool fit for combing purposes. The samples of Australian wool shown at the Centennial Exhibition at Philadelphia, in 1876, were remarkable for their fineness of staple, and evenness and regularity of curl, and much of it was 3 inches in length. But in weight of fleece the Australian wool is surpassed by that of our American Merinos, while the American sheep itself is heavier bodied and more robust than the Australian. The product of wool in Australia is very large; the export to England is over 250,000,000 pounds annually, while the home manufacture of woollen goods is both extensive and excellent. The superiority of the Australian Merinos to those of Europe, makes it the second best variety of this breed in the world, being surpassed only by the American race, and is a curious example of the improvement of breeds by a favorable change of climate, soil, and pasture, aided by the practical skill of the shepherd. As a specimen of the Australian sheep we give the accompanying illustrations taken from photographs which recently appeared in the "London Agricultural Gazette."



AN AUSTRALIAN MERINO EWE.

AN AUSTRALIAN MERINO RAM.

These are interesting, as showing how a well known breed may be modified. Climatic influences and breeding for a particular purpose, when both of these are combined, as in the case of the Australian Merino, result in an almost distinct breed.

Among the Farmers.—No. 40.

BY ONE OF THEM.

No topic more interests farmers than the discussion of prices of farm produce and the prospects, not of crops, but of prices. High prices are always satisfactory; big crops are satisfactory too, but our rejoicing is often marred by low values when we have bounteous harvests. Here in the State of New York, Eastern Pennsylvania, and New England and New Jersey, we have all along felt so sure of

Our Milk Crop,

sure that we could get good prices for butter, for cheese, or for milk, whether sold to go direct to the cities, or to the condensed-milk factories, to be marketed in that form, that we laughed at the thought of competition and planned and figured only to get the best possible prices—to prevent combinations of dealers and carriers against the producers, and sought to come in direct connection with the city consumers so far as was possible. That was particularly as regarded milk. As to butter and cheese, with our cheese factories and creameries we were beating the world; our butter made in June was sweet as a nut in March and May, and every year added to its perfection and keeping quality. All on a sudden we find ourselves

Beaten by the West!

The western dairymen stand forward as equals in cheese-making, and our superiors in butter-making—beating us several cents a pound in our own market, and for all that appears, they are quite as likely to keep the position as to take one second to New York or Pennsylvania, or other Eastern State.

I stopped in at a large butter dealer's store a few days ago, and learned of two sales which had just taken place. One was of a lot of State (N. Y.) Dairy butter of excellent quality at 20 cents per pound. The other of a smaller lot of Iowa Dairy butter at 30 cents, while the best New York State creamery butter was quoted at 25 to 27. There is something tangible about this 10 cents a pound, due to superb quality, and to the fact that one lot of butter represented the whole season's make from May to October, and the other was recently made. And while this is going on, that is, while the West meets the demands of the market and we do not,

Our Home Market is Getting Fastidious.

Consumers are discussing how milk is drawn—how it is cooled—whether the animal odors "are inherent" in the milk as it comes from the cow, or arise from uncleanliness of handling, the foul air of the stable or other contamination. The papers publish all sorts of impolitic things about the French method of shipping milk in little quart and two

quart glass jars or cans, put up upon the farm, and transported in that inconvenient and fragile form.

This delivery of milk in sealed glass cans has already grown to be quite a feature in the milk business of New York and of some other cities—and it is a question whether consumers will submit to the additional expense involved for the sake of the security offered against adulteration and uncleanliness on the part of the dealers, and against the temptation offered to servants to taken the cream off for their own table, or to drink part of the milk and fill up the vessel with water on the supposition that both the lack of cream and the thinness of the milk would be laid to the account of the milkman.

It is easy to see what the solution of the problem will be. Families who can afford to pay 10 to 15 cents a quart for milk, and 30 to 50 cents for cream, will have the privilege of doing so and getting what they pay for—pure milk of rich quality and pure cream, thick and high flavored at an expense not disproportionate to the outlay, pains, and care necessary to deliver the articles to them. Just so it is, and has been, in regard to butter. The fact that a responsible party vouches for every step in the process, and every mile of the way from the white clover and blue grass in Summer—and the sweet meadow hay and sugar-beets in winter, cropped and ruminated by healthy Jersey cows, through all the improved and well described pans and proceedings, until delivered safely and surely at the consumer's door, makes people who can afford it willing to pay 40 cents for the butter and 60 for the vouching and the fancy package and the certain and free delivery.

Other Products of the Farm.

In flush times fresh eggs were in demand in New York; during the winter common Western and barrelled eggs sold at 30 to 36 cents a dozen at retail, and it was no uncommon thing to find one or two out of a dozen which were not above suspicion. At that time we had a quick market for all the eggs we could bring to town at 60 cents a dozen, and people seemed really delighted to get them at that price; they valued so highly the ability to eat eggs without a thought of caution. So it is with many other things, especially bacon and sausages. A friend of mine cures all his young side pork as bacon, taking out the ribs, dry salting and rubbing with sugar, and I believe pepper, at any rate with a recipe of *his own*, and likely so to remain—smoking very mildly and putting up very neatly in muslin dipped in whitewash, and has a demand for it which he can hardly supply at nearly double the usual prices. The bacon really is excellent, and fries as crisp as pie crust, while still almost as white as snow, crisper than most bacon is when fried quite brown.

Retailing one's own Cheese.

At the Dairymen's meetings at Utica, to which I have before alluded in these columns, I met a very plain, common sense man who described how he had worked up a home demand for his cheese. His statement was to this effect: He thought he could not afford to sell the product of his dairy at what other *dairy* cheese was bringing. (The readers of the *American Agriculturist* doubtless know that in the New York market, and throughout the country too, "Dairy" butter and cheese means that made by individual farmers in distinction from "Factory" cheese and "Creamery" butter made on the co-operative or factory plan.) The cheese was most conscientiously and intelligently made, and more was sold as his which did not come up to the standard and do the maker credit. He marketed it himself at first among his friends and those to whom he was referred by them, gradually extending his circle of regular customers and having a demand each year for an increased quantity from those whom he once supplied. The result is his entire crop is taken, and he holds, or even advances, his price in the face of the general depression in values. That it was no fancied superiority which his cheese had over the common run, was made manifest by the sample which he had with him, which was rich and high flavored and delicious, and of excellent texture. Of course everybody can't do this. Everybody can't make such cheese. Very few can do it. Very few can make really "gilt-edged" butter. Yes, very few of those who think they do make it, and whose crying up of their own wares enables them to work off a few pounds of fair butter at gilt-edged prices, really know what the very best butter is. If they think they do, let them go into the market as buyers, and they will have the conceit taken out of them. The judgment of the open market is the taste of "the million," and the voice of the people is pretty near right. If a man can not tell good butter and good cheese when he sees it, is it a wonder that he cannot make it? We ought to have

A Training School for Butter and Cheese Makers.

If one or two first rate buyers would give lessons to butter makers, simply in the art and mystery of knowing good butter and cheese when they are met with, I think the quality of our produce would be rapidly enhanced. Suppose twenty tubs of butter of all grades, oleomargarine included, and as many cheeses, were presented to the class for classification, each pupil being required to examine and grade for himself first, and then to go through the lot after the samples are properly graded by the master, according to the market, and train his own perceptions to detect the subtle differences, and, at first imperceptible, excellencies. It seems to me such a class could easily be formed, I am sure I would like to join it and think that dairyfolks, men and women, might very well spend a week or two in New York and pay $1 for each lesson, and thus surely fit themselves to make better butter and cheese than ever before. With those who attended the class there would at least be one result. They would make a good deal less complaint of the commission dealer who is unable to get as high a price for their products as they think them worth. I verily believe that this project can be carried out if the Editors of the *American Agriculturist* will consent to have the letters addressed to them, and invite correspondence on the subject.

Stanchions for Milch Cows.

It becomes us all to submit with good grace to the inevitable; to meet without faltering that which we cannot escape, to yield, if possible, with a show of satisfaction to that which is stronger than we. So it is with cows in stanchions; their philosophy is that of necessity, and they are happy in it. We think that we would be miserable, fastened thus by the head; they are not. They are comfortable, cleanly, happy, if we can judge by their easy keeping, good yield of milk, aptitude to fatten, and their entire willingness to return to their torture after having been mercifully relieved for an hour or two. Stanchions are variously made: some are adapted to bruising the cow's knees, which is cruel; others press too tightly upon their necks. "The merciful man is merciful to his beast;" and whether a man would be counted merciful or not, it is policy for him to practice making his animals as comfortable as he can. The sills in which the stanchions are set must be low and thin. The edges of all parts brought in contact with the animal's neck, shoulders, or knees, must be rounded and smooth. The floor must be nearly level, so that cows will never slip upon it. It is preferable to have each cow's feeding-trough completely separated from those of her neighbors, for then cows are not reaching after the feed which is not their own, and made uneasy by the sight of that of others, as is frequently the case. We regard as an essential feature such length of floor that the cows *must* drop their dung into the liberal gutter behind them. In order to accomplish this, as cows vary greatly in length, the floors of different stalls must vary. It is therefore both useful and comely that this variation be uniform, and a row of stalls is at one end adapted to large cows, and at the other to small ones. Thus all cows are accommodated. Some cows lie down in stanchions as if it were the easiest, most natural and comfortable thing you ever saw; others look thoroughly uncomfortable. It is hard to judge of the comfort or discomfort experienced by our domestic animals. A cow will sometimes lie down in the pasture upon an angular stone, in a way that we should think would really hurt her, and not mind it at all—at least, hardly at all—not enough to get up and change her position. It is not necessary to give ourselves up to imagining the discomforts of cows who appear perfectly happy, live in good health, produce both calves and milk regularly and abundantly, and die full of years and of honors, and of fragrant memories. Some months ago, in one of the articles entitled "Among the Farmers," allusion was made to

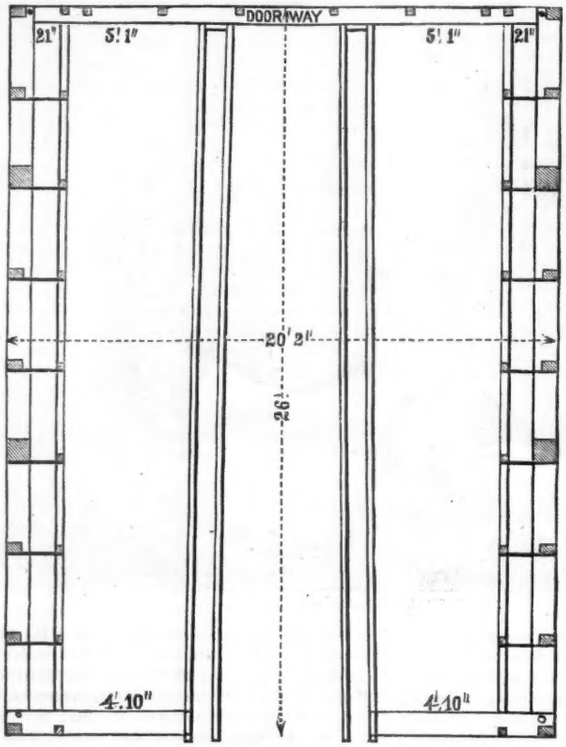


Fig. 1.—GROUND PLAN OF PART OF MR. SAMUEL J. SHARPLESS' STABLES.

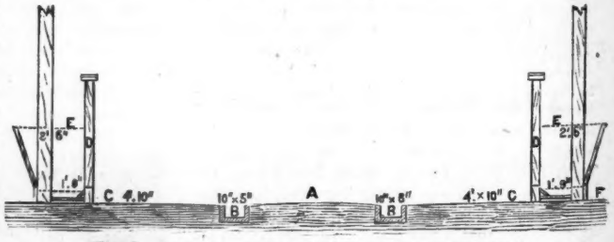


Fig. 2.—SECTION OF THE STABLES SHOWN IN FIGURE 1.

Mr. Samuel J. Sharpless' Cow Stable.

He has kindly furnished us with drawings which

enable us to satisfy the many inquiries elicited by the article alluded to. The plan, figure 1, is a ground plan of part of the stable, showing the two rows of stanchions, in which the cows stand facing in opposite directions out from the central passage way, and figure 2 is a cross-section of the same. Eight cows stand on a platform 26 feet long, giving to each cow 3 feet 3 inches. A third row of cows in similar stanchions faces those on the left

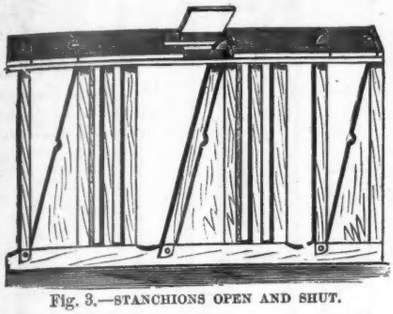


Fig. 3.—STANCHIONS OPEN AND SHUT.

with a passage 5 feet wide between them, while upon the right is a row of roomy loose boxes used as lying-in stalls. The cows in stanchions stand upon platforms varying in the extreme from 4 feet 10 inches to 5 feet 1 inch in width, and having a slope to the rear of 1 inch in five feet. Behind the cows is a gutter (*B*, fig. 2) 10 inches wide in the clear, having a sloping bottom, being 3 inches deep at the beginning and 8 inches at the lower end. The passage-way (*A*, fig. 2) between the gutters is a cement grouting, smooth enough to be cleanly, and rough enough for good foothold.

Figure 3 is a diagram showing three of the stanchions, two of which are closed and one is shown open—the trap lifted to show construction. The sill in which the stanchions are set is 3 inches thick and 6 inches high. There are three fixed stanchions and one movable one. They are 1¼ inch thick and 4 inches wide. When closed, the movable one is held in position by a "trap," as shown. This being lifted, the stanchion, having the pin upon which it is hinged on one side of the center, falls open of its own weight. After the cow puts her head through, the stanchion is placed erect, the trap, being lifted by the motion of the stanchion, falls behind it and thus locks it in place. The space of 12 inches on the right of the movable stanchion is filled by a board. The whole hight of the stanchions is 4 feet 6 inches.

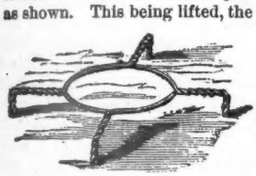


Fig. 2.—WIRE REST.

The manger (*E*, fig. 2) is 21 inches wide at the bottom, 30 at the top and 2 feet high, and each one is separated from the others by cross-partitions. It would be very easy to so connect the traps to a rope, that all could be opened at once by a single pull. This seems very desirable in case of fire or other emergency, and could be so arranged as not to interfere with the ordinary working of the stanchions.

A Few Words On Under-Draining.

BY JOSEPH HARRIS.

[The following is a portion of a letter to a gentleman in Mass., who inquired of Mr. Harris as to draining. ED.]

The truth is, all soils must be drained before they can be cultivated to the best advantage. And all a farmer has to do is to find out whether they are or are not already drained. Some soils are drained by resting on a porous rock, or on gravel, or on porous sand. The retentive clay soil at Rothamsted, where Mr. Lawes has made, and is still making, his celebrated experiments, is drained by resting on the chalk. On my own farm I have put in several miles of under-drains, and all except one have paid me well. I cut all my drains, with this one exception, in the winter and spring—principally in the spring, when the land was full of water. By the time we had got down three feet, as a rule, there was so much water entering the drains that we had abundant evidence that we were not working in vain.

One under-drain I cut in the summer, where I *thought* it was needed, but this drain has never discharged water enough to pay, so I advise Mr. R. to cut his ditches in the spring, say in April, and if he finds plenty of water he will know that he is not wasting his time. And furthermore, if he finds plenty of water, he will soon learn how to lay the tiles properly. All he has to do is to cut the ditches in such a way that the water will drain off; he then has simply to lay the tiles so that they will carry off the water, and when they are laid cover them up.

I have said, I always found plenty of water in the land in the spring. But once I dug a drain through a basin on high land that I knew was wet. It was in May and the weather was hot and the soil a stiff clay, and very dry and hard. The men urged me to give it up. And in fact, one warm day they came home about ten o'clock and said, "It was no use digging. There is no sign of water and the land is so hard that we cannot make wages."—I replied, "There is water there, *somewhere*. The land is wet in the spring and as hard as a brick in summer. It needs draining and I will at least finish the drain marked out."—They went back, grumbling, and in less than an hour struck a spring that threw up a stream two or three inches in diameter and several inches high, and it continued to run at this rate for several days and then ceased. But it discharges a large quantity of water every spring, and I have no doubt drains several acres of land before too wet.

Hints and Helps for Farmers.

RESTS FOR MILK STRAINERS.—When milk is strained into shallow pans, the strainer is generally placed in the pan, and rests in the milk. This is objectionable, and may be avoided by using frames which rest upon the tops of the pans, and upon which the strainer may be placed. At figure 1 is shown a rest made of strips of wood, and at figure 2 one of wire. A metal frame is better than a wooden one, as it will not absorb milk and become tainted. At *a*, fig. 1, is shown one of the wires which are attached to the frame to form the rest.

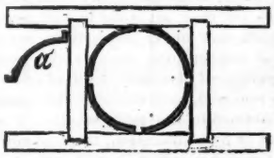


Fig. 1.—STRAINER REST.

ARRANGEMENT FOR FEEDING PIGS.—The low price of pork renders it necessary to feed pigs as cheaply as possible. Whole corn is a costly feed, and is not very healthful for young pigs. They thrive best on sloppy food in which milk, whey, bran, middlings, or corn meal can be mixed. Where milk or whey is not to be spared, a mixture of bran and meal with water will make a good food. This kind of slop may be prepared as follows: A large hogshead is sunk three-fourths of its depth in the ground near the pens. This is so arranged (see figure 3) that the slops and waste milk or whey from the dairy and kitchen may be run into it through a drain pipe. For a large hogshead or tank holding 100 gallons, 4 bushels of mixed bran or middlings and meal may be thrown in, and the vessel filled with water. The mixture is stirred, and in a short time ferments, when it is ready for use, and may be lifted with a scoop into the troughs. As the supply diminishes, more water and feed may be added from time to time to keep it replenished.

Fig. 3.—PIG-FEEDING.

WIRE FENCE TIGHTENER.—A wire fence needs frequent drawing up, or it sags and becomes useless. The ordinary method of tightening, by means of a species of winch and roller, is costly, inconvenient, and ineffective. The method used by the telegraph companies, however, is, as may be expected, a most effective and a cheap one, and may be applied to ordinary purposes with great ease, one set only being required for one farm. It consists of a pair of grip-tongs and a set of small blocks and tackle, and is used as shown at figure 4. The tongs can be made by any blacksmith, and the blocks and tackle can be procured at any shop where tools are sold. A hook of iron is used to attach the block to the post, and as the wire is drawn up, the free end of the loose rope may be given a turn around the post while the staples are driven tight to hold the wire. This method is simple.

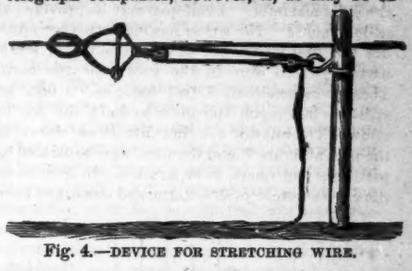


Fig. 4.—DEVICE FOR STRETCHING WIRE.

A FENCE FOR FRESHETS.—A panel of fence that offers no obstruction to a swollen stream may be made as follows: A short post is set in each bank, rising only one foot above the ground and near to the post of the permanent fence. A two-inch hole is bored in each of these short posts on the side next to the water. A piece of three-inch square timber, or a round pole, is fitted at the ends into these holes, so that it will turn easily. A few upright boards are nailed to this bar and to a top-rail, as shown in figure 5, so that the top-rail rests against the permanent fence posts on the side down the stream. The panel is held in place by two props, as shown, and will give way when the high water presses against the fence; it then lies flat while the current flows over it. When the water subsides the panel is set up and propped as before.

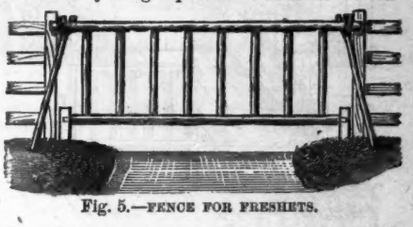


Fig. 5.—FENCE FOR FRESHETS.

LEVELLING DRAINS.—"N. T. N.," Karnten, Austria, sends a sketch and description of a method of levelling drains. He chooses a straight piece of timber or scantling, and hollows it on each side, as shown at figure 6. The hollows form water channels, and when the timber is placed in a drain, and a small quantity of water is poured into it, the direction of the slope and the velocity of the current can be readily ascertained. This contrivance may be made very useful in laying out drains and irrigating channels.

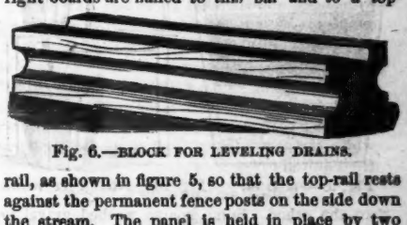


Fig. 6.—BLOCK FOR LEVELING DRAINS.

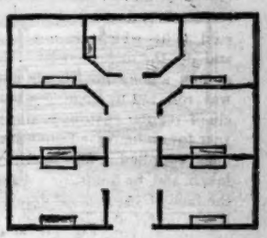


Fig. 7.—CALF PENS.

CALF PENS.—Where calves are raised it will be found very convenient to provide separate pens for them. This will be the more necessary where winter dairying is practised and cows of extra

quality and value are kept. The calves are then too valuable for veal, and the heifers are raised on the skimmed milk. A calf pen may be provided at little expense. The writer has made two pens during the past winter out of common hay or straw barracks which were in the yard near the barn. These were enclosed 8 feet high, and a floor of rails was laid upon the girts to hold the hay or straw. The interior was then divided as shown in the plan at figure 7, and the pens were separated by partitions and doors, as at figure 8. In these pens the calves were kept dry, warm, and clean, and have

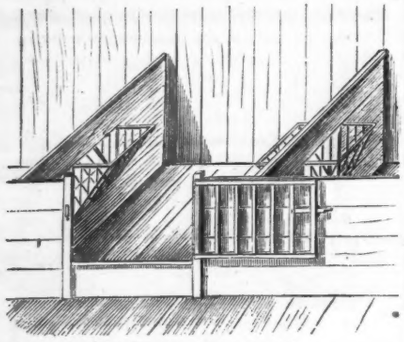


Fig. 8.—PENS FOR CALVES.

thrived better than under any previous arrangement. The pens, if 6 feet square, or 6 x 8, will give ample room for a calf to frolic about and keep itself warm by the exercise. A small hay rack and a little feed box may be provided in which a small supply of hay and feed may be furnished.

A SIMPLE FILTER.—Another European correspondent sends a plan for making a water filter. He provides two common flower pots, one larger

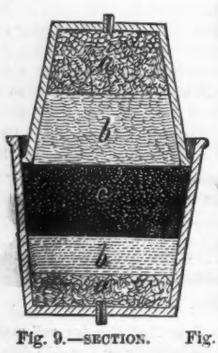


Fig. 9.—SECTION.

Fig. 10.—FILTER AT WORK.

than the other. Some coarse washed gravel (*a*, fig. 9) is placed at the bottom of the larger one, upon this a layer of fine washed sand, *b*, then a layer of broken and washed charcoal, *c*; the smaller pot has a layer of gravel and sand arranged in it, as shown in the engraving, and is then inverted over the first pot; pipes are arranged to carry the water in and out, as may be needed. If a pail of water is placed so that a small bent lead pipe may be arranged as a siphon (as shown at figure 10), a quantity of water may be run through the filter in a few minutes at any time it may be wanted for use.

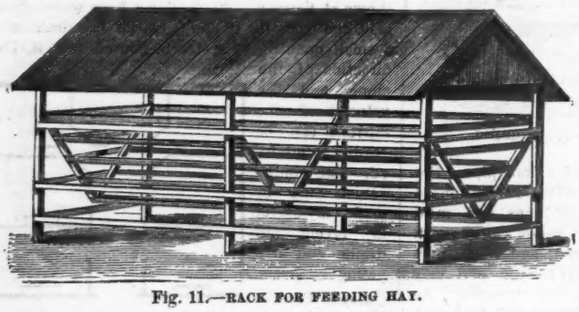


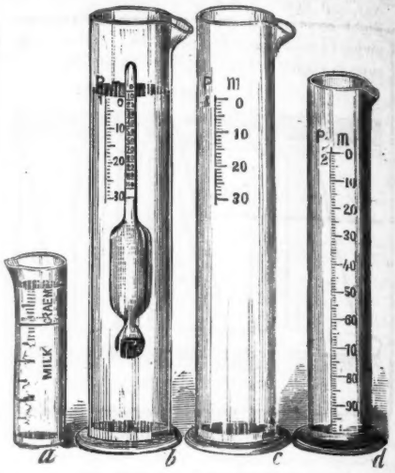
Fig. 11.—RACK FOR FEEDING HAY.

A HAY-FEEDING RACK.—"A Subscriber" sends a sketch of a rack for so feeding hay that the cows or cattle cannot waste it. It consists of a frame closed in with fencing boards, leaving a space in which the cattle can put their heads to reach the hay. The hay is thrown into a V-shaped rack inside, as shown in figure 11, and whatever hay is pulled out from this by the cattle, falls into the outside rack and is saved from trampling and waste.

Testing Milk and Measuring Cream.

It is very desirable to know which is the best cow in the dairy, and which is the worst; because unless actual tests are applied, the cow which the owner considered his best, may really be one which does not pay for her feed and care. It is not the quantity of the milk alone, but the quality, together with the quantity, which is the true test of value, and this cannot be ascertained without some accurate means of judging, such as are supplied in the shape of test tubes, cream gauges and lactometers. The tubes are small glass measures about five inches long, one inch in diameter, with a lip at the top as shown at *a*. The tubes may be marked with a three-cornered file, in inches, half inches, and tenths, if desired; but this is not necessary unless the proportion of cream given is to be ascertained. This, however, is useful when the value of different feeding stuffs is in question, as in a recent case with the writer, when in a test of the value of palm-nut meal, it was found to increase the yield of cream from 1 inch in 4 of milk to 1¼ inch during two weeks' use of it, the increase being steady and gradual for the whole time. In the illustration given, one tube is shown at *a*, in which the cream stands at one inch. In setting milk for a test in this way, each cow's milk to be tested is stirred immediately after milking and straining, and poured into separate glasses, exactly up to the 4-inch mark, and without any foam upon it. The samples are then set away in the usual place for the milk, and under precisely the same conditions as to temperature, etc., as the rest.

To test the quality of the milk itself after the cream has been removed, or to discover the quantity of water contained in the milk, whether it be naturally present or by adulteration, three or more glass jars, one for each cow to be tested, and a lactometer, are used. In using the test-jars, the largest ones, *b*, *c*, are filled with milk, as before described for the small test-tubes, up to the mark 0. This is 10 inches from the bottom. Each mark upon the jar represents 1 per cent, and the quantity of cream which rises is thus shown. To test the milk itself, the cream is removed carefully from the jars, and the smaller jar (*d*) is filled with water up to the mark 0. This jar is marked with 100 lines, dividing its length up to 0 with 100 equal spaces; each one, therefore, represents 1 per cent. The lactometer is then inserted carefully—because it is fragile and should be carefully handled—into each of the milk jars in succession, and the depth to which it sinks in each noted (see *b*). The jar in which it sinks the deepest is the poorest milk, and the lactometer may probably mark 26, 28 or 30 on the scale, showing the specific gravity to be 1,026, 1,028 or 1,030 to the 0 of the scale, representing 1,000, which is the specific gravity of water, or rather the arbitrary point given to water as the fixed standard from which the specific gravity of all other liquids is measured, pure water being generally accepted as the base or key which regulates all other liquids as to the scale of their relative weight. If a sample of milk marks 1,028, or lower, it is too poor and watery to be satisfactory or profitable, and if one marks 1,030 or over, it is as good as can be expected. If it is desired, in case of suspected adulteration, to find the quantity of water that has been added to the milk, the suspected milk is put into one jar, as before mentioned, and milk known to be pure is put into the other one. After the cream has been removed, the lactometer is inserted into each sample, and the depth to which it sinks in each is noted. If the suspected milk marks lower than the other, adulteration is indicated, and the proportion of it may be known by adding to the pure

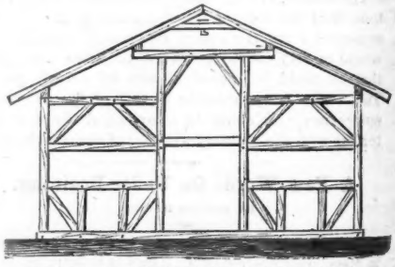


GLASSES FOR TESTING MILK.

milk as much water from the per cent glass which has been previously filled up to 0, as will bring the lactometer to the same depth in it as in the other one. The percentage of water added will be shown by the marking on the per cent glass, and this will show the extent of the adulteration.

Barn Without Cross-beams.

Since the use of the horse hay-fork has become common, a change has been made in the construction of barns. These buildings are now required to be free from obstructions overhead, so that the movable fork can have freedom to act in any part of the barn. Modern barns are so designed as to cover as little ground space as possible, thus saving cost in the roof, to be high rather than spacious, and to be so arranged that there shall be no cross-beams to interfere with the run of the hay-fork with its load from end to end. Those who are interested in designing or constructing barns are, therefore, obliged to take this into account in making plans. A frame for a barn, designed with this end in view, is given in the accompanying illustration. It is intended to have ranges of stables, or stalls for cattle below, with a wide floor between these, to be used for the purpose of feeding and preparing food. Above these are the bays for storing hay and grain, on either side, and the frame



SECTION OF BARN WITHOUT CROSS-BEAMS.

is so arranged that sufficient strength and stiffness is given to it by bracing in each bent. The bents are connected as usual on the outside, by the plates and girts, and on the inside by the beam which sustains the floor above the stables, strongly braced to the posts, and by purline plates upon the inner posts; cross-beams run from one purline plate to the other, and the frame for the hay-carriage is suspended to these, as shown in the design. This mode of framing gives great strength without any interfering timbers inside to come in the way of unloading hay or grain, as the bays are entirely open from the lower beams up to the purline plates.

Pens and Yards for 150 Hogs.

For answer to several inquiries for a plan of pens and yards for keeping about 150 hogs in a convenient and healthful manner, we offer the following. This is an enlargement of a smaller system

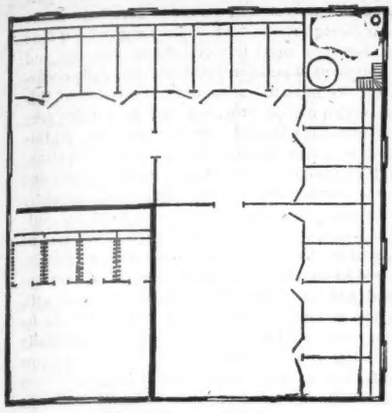


Fig. 1.—PLAN OF PENS.

of pens and yards which have been found satisfactory in every respect, especially so far as regards saving of labor. The pens are built in a range on each side of a central feed-house, shown at the corner of figure 1. This house is a two-story building. In the upper part feed is stored, to be cooked or prepared on the lower floor. A stairway in one corner leads to the upper story; opposite to the stairs, and at the right of the doorway, is a pump connected with a cistern which receives all the flow from the roof. The water is shed from the rear of the roof, so that none escapes into the yard. A hose is connected with the pump, which serves to convey water into the feed-troughs in both wings of the pens, for cleansing them and to supply the animals with drinking water. Opposite to the pump is the boiler or the mixing vat. As a boiler will be found indispensable at times, one should be provided at the outset, as it may be used for soaking or otherwise preparing food when not needed for heating purposes. A passage-way leads on either hand from the feed-room down the range of pens, as shown. The arrangement of the pens is illustrated at figure 2; the passage-way is at *a*, the feed-trough with spout at *b*; the troughs are protected by cross strips fastened from the partition wall to the edge of each, as shown by the dotted lines, so as to prevent the hogs from lying in them; at *c* is a sliding door, by which access can be gained from pen to pen all through the range when necessary for the purpose of changing or otherwise managing the occupants; at *d* is a slatted ventilator fixed in the wall over each door, also shown at figure 4. The yard and pens shown in the left-hand lower corner of figure 1 are for brood sows with pigs, which are kept separate from the rest of the herd. The pens are arranged as the others, with the addition of safeguards for the young pigs placed around the walls, about eight inches above the floor and six inches from it, and attached to it by means of iron straps (see figure 3). These are to prevent the pigs from being crushed by the sows when they lie down, as is often the case when no protection is furnished. At figure 4 is seen the elevation of one wing of the range with the feed-

Fig. 2.—SECTION OF PEN.

Fig. 3.—SAFEGUARDS.

house. The shed is made from 12 to 16 feet wide, 12 feet high in front and 8 feet in the rear. Each pen should be at least 8 feet wide, which would give from 60 to 100 square feet, accommodating 5 or 6 pigs; sheds 100 feet long, with yards covering the included ground, would give room for a herd of 150. The front doors of the pens are made double, shutting against each second post, and opening from each other. One fastening answers for all the four doors; this consists of a semi-circular piece of hard-wood plank, which turns on a bolt, as shown at figure 5. When at rest it falls so as to fasten the four doors, and can be turned either way in an instant to open either pair. This should be secured firmly with a strong bolt with a large head. The floors of the pens may be made of hydraulic lime concrete, thoroughly saturated with gas tar. Such a floor is always dry, clean, and perfectly impenetrable either by vermin or by the swine. An occasional dressing of hot gas tar will keep lice and fleas at a distance, and thus promote the health and growth of the herd. Another method of making the floor, which the writer has found excellent, is to use double hemlock plank, laid so as to break joints, and saturated with hot gas tar. This is water and vermin proof, and also saves all the liquid manure. To do this most effectively, the floor is sloped for two or three inches, and a slightly hollowed gutter conveys the drainage into the outer yard, which should be paved with cobble stone or cemented, if possible, or otherwise well bedded with litter or other absorbents. The best absorbent is dry swamp muck; when this can not be provided, hard-wood sawdust, sand, dry earth,

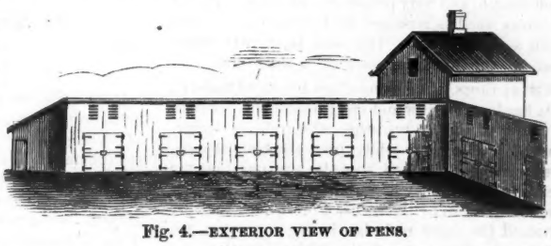


Fig. 4.—EXTERIOR VIEW OF PENS.

or litter from the stables, may be kept in the yard; this will be turned over and well mixed.

Prepare for Fodder Crops.

Something to help out the pastures is necessary in all kinds of farming where cows are kept. Under present circumstances it does not pay to pasture during the whole season. This occupies too much

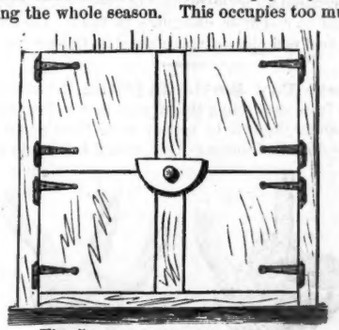


Fig. 5.—FASTENING FOR DOORS.

land, upon which the present onerous taxes alone will eat up all the profit. Five to seven acres can not now be spared to furnish feed for one cow. One acre may be found to be sufficient by good management and the use of fodder crops, to be cut green. Of these, a succession of two, or even three, may be grown during the season upon the same ground. For instance, fall-sown rye may be cut from May to June; by the use of a swivel plow a strip from which the rye has been cut may be plowed and sown to oats, oats and peas, oats and barley, or peas alone; but the mixed crops will be found the most profitable. The oats first sown may be cut early in July; and millet, sweet corn, or roots, may be sown for use in September. The ground cleared of this last crop may be sown to rye or wheat again, and so the rotation may be kept up. The produce of one acre thus managed will be surprising, and the manure made by feeding it to cattle, sheep, pigs, and horses, will be sufficient to keep the soil in a rapidly improving condition. It will be seen that no seed is produced, and the exhaustion of the soil in this respect is avoided. This, too, enables the soil to reproduce year after year the same crops without deterioration. An important point to observe is to avoid sowing or planting too thickly, in order that the fodder may be properly matured, perfect in color, and well supplied with nutritive matter, in place of mere water, as is the case in the very heavy yield produced by close planting on rich soils; and at the same time to feed with it some rich concentrated food, such as cotton seed meal, by which the laxative effect of succulent provender is prevented, and at the same time the manure—and consequently the soil—is enriched.

Composition and Value of Indian Corn.

BY PROF. W. O. ATWATER, WESLEYAN UNIVERSITY.

The following analyses give an idea of the composition of several varieties of corn and cobs:

KINDS OF CORN.	Water.	Ash.	ORGANIC SUBSTANCE. Albuminoids.	Woody fibre.	Carbo-hydrates	Fats.
1. New England Yellow, 8-rowed.	10.5	1.3	9.7	2.4	71.6	4.4
2. New England Yellow, 8-rowed.	15.1	1.4	10.0	1.2	67.0	5.3
3. New Engl. "Golden," 8-rowed.	12.5	1.6	10.3	1.4	69.4	4.9
Average of Nos. 1, 2 and 3.....	12.7	1.4	10.0	1.7	69.3	4.9
4. King Phillip or Rhode Island..	9.8	1.6	11.9	2.2	70.1	4.5
5. Mass. White Flint.....	10.2	1.4	9.2	1.5	74.3	3.4
6. Mass. Red Flint.....	12.0	1.1	12.1	2.0	69.3	3.4
7. Early Dutton.....	8.1	1.5	9.6	2.3	72.6	5.7
8. Stewell's Evergreen Sweet....	10.9	1.9	11.1	2.6	65.8	7.7
9. Burr's Sweet.....	10.7	2.2	11.7	4.9	62.7	7.8
Average of Nos. 8 and 9.....	10.8	2.1	11.4	3.8	64.3	7.7
10. Western Yellow.....	13.9	1.3	8.8	1.6	81.9	3.9
11. Western Yellow, Kansas.....	11.3	1.1	8.8	1.3	72.9	4.6
12. Western Yellow, Illinois.....	13.6	1.4	9.2	3.1	69.1	3.6
Average of Nos. 10, 11 and 12..	13.0	1.2	8.9	2.0	70.8	4.0
13. Southern White, large 16-rowed	11.6	1.5	10.6	2.7	69.6	4.1
14. Southern White, ordinary.....	13.8	1.3	8.9	0.9	71.1	4.0
15. Cobs from N. E. Yellow, No. 2.	11.5	1.3	1.2	38.3	47.6	0.1
Cobs, German (Wolff's Tables)	14.0	2.8	1.4	37.8	42.6	1.4

Nos. 3, 5, 6, 9, 11, and 12, were analyzed by Mr. S. P. Sharpless; No. 13, under direction of Prof. S. W. Johnson; the rest by the writer and his assistants.

Taking the results of German experiments for digestibility and the valuations previously given, as a basis, the digestible ingredients and valuations of the kinds of corn above named will be as follows. The digestibility of cobs has not, so far as I know, been tested. The proportions are, as assumed by Wolff, evidently from analogy with materials that have been determined:

KINDS OF CORN.	Number of Samples.	ORGANIC SUBSTANCE DIGESTIBLE. Albuminoids.	Carbo-hydrates.	Fats.	Nutritive Ratio.	MONEY VALUE. Dollars per 100 lbs.	Comparison with Meadow Hay—100.
		p.c.	p.c.	p.c.	1:	$ ct	
N. E. Yellow, 8-rowed, av'ge..	3	8.4	65.8	3.7	8.6	1.09	1.70
King Phillip or Rhode Island.	1	10.	66.7	3.4	7.5	1.18	1.84
Mass. White Flint.....	1	7.7	70.3	2.6	9.9	1.00	1.56
Mass. Red Flint.....	1	10.1	66.0	2.6	7.2	1.07	1.67
Early Dutton.....	1	8.1	69.2	4.3	9.9	1.16	1.81
Sweet, average.....	2	9.6	61.8	5.9	8.0	1.19	1.86
Western Yellow, average.....	2	7.5	67.3	3.1	10.0	1.04	1.63
Southern White, ordinary....	1	7.5	67.1	3.1	10.0	1.06	1.66
Cobs from N. E. Yellow.....		0.5	43.0	0.0	86.0	.40	0.64
Cobs, German—Wolff's Tables		0.6	41.7	0.4	71.2	.40	0.64

Eastern vs. Western Corn.

These figures confirm the current opinion of farmers that eastern corns have a higher nutritive value than western, though the difference is less than is frequently assumed. The sweet corn leads; then come the Early Dutton and Rhode Island, which, however, appear to better advantage, because of the dryness of the samples, then the New England Yellow or Canada, the Southern White, the Western Yellow, and lowest of all, the Massachusetts White Flint. But it must be borne in mind that the number of samples is small, and further analyses may give somewhat different results.

The Nutritive Value of Cobs

in the table is over one-half that of corn, higher

than most farmers would put it. As I have said, accurate experiments to test their digestibility are still lacking. The proportions assumed are such as seem probable from experiments with other food. It will be noticed that the value is almost entirely in the carbohydrates, there being extremely little of albuminoids and fats, the most important ingredients. Analysis and experience both indicate that fed alone they would barely keep an animal from starving. But fed with other materials to furnish what they lack, they must be valuable. It would be very foolish to make a pair of boots all of neck or split leather; but with good materials for soles and fronts, the poor leather will do for backs and linings, and it will be far better economy to put it there than to throw it away. A great many farmers practically recognize this principle in feeding corn and cobs together.

Western Corn Shelled vs. Eastern with Cobs.

No. 2 was a good fair specimen of eight-rowed New England Yellow corn, grown in 1877, on the farm of Mr. C. Sage, of Middletown, Conn. The ears May 1, 1878, gave 16¼ lbs.=(1/6) cobs per 100 lbs., which is probably a fair average for well cured corn of that kind. The composition was just about equal to the average of the samples of eastern corn, Nos. 1 to 7 in the table. Nos. 10 and 14 were taken at the same time from the store of Messrs. Coles & Atkins, Middletown. No. 10 weighed 53½ lbs. per measured bushel; cost 62½ cts. per bushel of 56 lbs.; was pronounced a very good specimen of Western Yellow corn, and agrees in composition with the average of the three samples of that kind. No. 14 weighed 54 lbs; cost 70 cts. for 56 lbs., and was likewise a very good quality of Southern White. 100 lbs. of ears of Mr. Sage's corn, and 100 lbs. of each of the others shelled would compare as below.

	Digestible.				
	Albuminoids. Lbs.	*Carbohydrates.* Lbs.	*Fats.* Lbs.	*Nitrogen. Ratio.*	*Valuation.*
N.E. Yellow Corn 83¼ lbs.	7.0	52.8	3.4	1:89	$ .93
N.E. Yellow Cobs 16¾ "	.1	7.1	—	1:71.0	.07
N.E. Yellow Ears 100 "	7.2	59.9	3.5	1:92	1.00
W. Yellow Corn 100 "	7.4	67.8	3.0	1:10	1.05
Southern White 100 "	7.5	67.1	3.1	1:10	1.06

That is to say, by the above figures, 100 lbs. of Mr. Sage's corn in the ear, with 83¼ lbs. of corn and 16¾ lbs. cobs, contained a trifle less nutritive matter than 100 lbs. of the Western Yellow corn, for which his neighbors were paying $1.07, or the Southern White which cost $1.25.

The Varieties of Durra or Sorghum.

In February, 1877, we gave an engraving of one of the common forms of *Sorghum vulgare*, and a rather full account of the plant and its uses. Many common names have been given it, and it was suggested that "Durra" be adopted for the plant, as it is brief, and the name by which it is generally known throughout the East. In November last, the Drooping Sorghum was figured and described; this, though it has been regarded by some botanists as a distinct species, and called *Sorghum cernuum*, appears to differ from the other only in the nodding cluster of grain, which, instead of being erect like the other, when ripe points directly downwards, the stalk just below the cluster being bent at a sharp curve. This is the grain that has been sent out under the deceptive and absurd name of "Pampas Rice." These are but two forms of a plant that has been used to some extent in the Southern States for forage, as it allows of repeated cuttings, and in the aggregate yields a large amount in a season. Its grain affords the principal food of many Eastern people, as in Syria, where, as in Nubia, there is scarcely any other grain cultivated; it is extensively grown in parts of India, and in Northern China, where it is cheaper than, and largely takes the place of rice. The cultivation of Durra for its grain has not been attempted to much extent in this country—at least not in the older states. While abundantly productive, the grain is not very nutritious as compared with other grains, though it has been commended as a cheaply produced food for animals. The grain has been experimented with to some extent on the Pacific Coast. Though the people there have the finest wheat in the world, a change, even to a less nutritious flour, is pleasing, and that from Durra is acceptable as a variety, just as Buckwheat flour is often used. A plant that has been so many centuries in cultivation under a variety of conditions, will naturally present numerous varieties, just as Indian corn and other cereals have done. California being in direct communication with eastern countries, will, as a matter of course, receive their products; several forms of the Durra have already been introduced there, and we may expect others to come. Mr. William H. Carson, seedsman, of this city, has sent us heads of three well marked varieties received from California, which he offers to those who wish to test their value. While the heads of these have a strong general resemblance to those of the two forms we have figured, the grain is quite different in size and appearance. One of these comes labelled as the

Fig. 1. Fig. 2. Fig. 3.

VARIETIES OF DURRA.

BROWN EGYPTIAN CORN; this has very large heads which curve over like those of the Drooping Sorghum, figured in November last; the grain is not so large as in that, and is of a light chestnut color. It is stated that this variety in California has yielded 200 bushels of cleaned grain to the acre.

WHITE EGYPTIAN CORN.—This variety also has drooping heads, which are broad in proportion to their length, and very productive of seed, a pound of clean seed is reported to have been obtained from a single head. The seed is slightly larger than in the foregoing and of a dull white.

CHINA CORN is the name given to a third variety; this has long, narrow and erect heads, smaller than in either of the others, while the grain is larger, and of a clear pure white, presenting an attractive appearance; indeed, so white are they, that the heads look as if they had been bleached. To show the relative size of the seeds, a few grains each are given of the exact real size, in the engraving, fig. 1 being the Brown, fig. 2, the White Egyptian, and fig. 3, the China Corn. These two white varieties are said to make a very fine flour, which, when thoroughly bolted, is used for making muffins and other cakes that are made very light and eaten hot, and the flour is highly praised by those who have eaten it thus cooked. The whole ripe grain is cooked like rice, and it is also eaten before it is ripe, prepared after the manner of green corn, when it is said to resemble chestnuts in flavor; the two last named varieties being preferred for this purpose.

A Cat's Paw Knot.—To prevent the end of a rope from unraveling the strands may be fastened in a manner known to sailors as a "cat's paw." This is done as follows: One strand is bent down

Fig. 1.—BEGUN. Fig. 2.—FINISHED.

as at figure 1, the second strand is bent over the first, the third is bent over the second one and then passed under the first one, which locks the whole and makes it a tight knot, as seen at figure 2. The ends of halters, hay ropes, and other ropes used about a farm, should always be thus secured.

Concentrated Foods.

Concentrated foods for cattle may now be purchased in the markets at moderate prices. For many years past the large amount of cotton seed yearly produced has been either in great part wasted, or has been sent abroad to enrich the farms of our foreign rivals. An entire cargo of 900 tons of cotton-seed meal left our shores recently, and the shipment of smaller quantities is of daily occurrence. We have use at home for every ton of this meal, which can be procured now at a price very little more than that of corn meal or bran. At this price it is a very cheap food, and well worth attention for its value in enriching the manure. Palm-nut meal is another rich concentrated food, especially for fattening animals, and for cows kept for butter. A sample recently tested gave 13 per cent of fat, and in feeding it the cream was notably increased in quantity. As in the case of all concentrated articles, these foods should be used with caution, and at first only small rations should be given, one pound at a feed, for instance, gradually increasing up to the safe limit of two qts. for a cow and four to six qts. for a fattening animal. When mixed with corn meal or bran, it should be in the proportion of one-eighth to one-fourth. It will be found economical, when prices are low, to stimulate production in an intelligent manner, reducing the cost of the product and enlarging the demand by supplying it at reasonable rates, and to this end there is hardly a better way than by using cheap concentrated food in judicious proportions.

The Kentucky Coffee-Tree.

BY PROF. C. S. SARGENT, DIRECTOR OF THE ARNOLD ARBORETUM OF HARVARD UNIVERSITY.

In studying the claims of some of our American Trees to more general consideration at the hands of those planters who plant for profit rather than for ornament, my attention has been directed to the Kentucky Coffee-Tree (*Gymnocladus Canadensis*). That a tree may be entitled to consideration as a subject for general planting, it is requisite: 1. That it should grow spontaneously over a large area of country, thus proving its strong constitution and power to thrive under various conditions of climate. 2. That it should grow rapidly and without requiring peculiar or nice treatment and cultivation. 3. That its products should be specially suited to some important employment. Let us see whether the *Gymnocladus* possesses any claims to these qualities. Of its power of adapting itself to very different climatic conditions, there can be no question. Few trees range over a wider area of the United States. It grows from Canada and Western New York to Wisconsin, and south to Kentucky and Tennessee. It extends across the Missouri into Nebraska; is common in Missouri and Arkansas, and not rare in Kansas and the Indian Territory. It is not found in New England, where, however, it is perfectly hardy, nor in the Atlantic or Gulf States. The Kentucky Coffee-Tree grows always in rich, strong soil, generally along river valleys, and reaches, probably, its largest size in that of the Lower Ohio. It is not a particularly fast growing tree, nor does it increase more slowly than other North American trees, while it produces a wood equally strong and heavy. The finest specimen I have ever seen (and it is one of the handsomest trees it has been my good fortune to behold anywhere), stands by an old historic mansion on the left bank of the Hudson, nearly opposite the City of Newburgh. This tree was procured from a nursery, and planted where it now stands in 1825. It is now eighty-eight feet high, with a trunk which girts ten feet, at three feet from the ground, and well below the point where the stem forks into the main divisions. Supposing that the date, 1825, has been correctly recorded, and that its stem was two inches in diameter at that time, it has increased thirty-eight inches in fifty-four years, or an average of nearly three-quarters of an inch a year for the whole period. But as this specimen, no doubt, received extra care for many years after it was planted, its growth has probably been exceptionally rapid and vigor-

ous, and should not, therefore, be taken as a fair sample of what the tree may be expected to do. A specimen before me, cut from a tree which grew on the banks of the Ohio, in Kentucky, is eleven inches in diameter, and has fifty-three annual layers of growth, or an average increase of less than one-fifth of an inch, a rate of growth which is probably much nearer the average ordinarily attained by this tree than that of the Hudson River specimen. The Kentucky Coffee-Tree is easily raised from seed, or from cuttings made from pieces of the root, which grow very readily, if planted like potatoes; and young plants will be found hardier and more capable of withstanding ill usage than seedlings of many other trees employed in forest planting.

But is the wood of this tree valuable enough to warrant its more general cultivation? The younger Michaux, a French botanist, who travelled extensively in this country, in the early part of the century, and afterwards published the history of North American Trees, which is still the standard authority on the subject, examined the wood of the Kentucky Coffee-Tree, and formed so high an opinion of its value that he recommended its general introduction into Europe as a timber tree. Subsequent writers on our trees have followed Michaux, often in his own words, in praising the tree, but without, perhaps, always very critically examining its real merits. So that now, while there is a general impression among those who interest themselves in such matters, that the tree is of great economic value, there is very little exact information attainable, I find, on many points in regard to the wood of this tree. I have had its specific gravity calculated, as the specific gravity of a wood appears, on the whole, the best test of its strength and value. That of this wood is .609; of Ailanthus, .614; and of White Oak, .662. So that, in spite of its slow growth, even the fast growing Ailanthus produces more valuable wood, while White Oak is considerably ahead of it. It is, however, in its turn, superior to Black Walnut, Cherry, and many other woods largely used in cabinet-making. But the specific gravity is no test as to the durability of a wood, for the lightest woods, like Catalpa, are often the most durable; and nothing but actual trial can determine how any wood will behave when exposed to alternating dry and wet. If proved to be really durable, this will be an admirable wood for railway ties, fence-posts, and out-door construction; and if any reader of the *American Agriculturist* has any personal knowledge of its having been used for such purposes, or for furniture, or otherwise, he will confer a favor on the writer of this article by communicating with him on the subject. The specimens of this wood which I have examined are close-grained, compact, very tough, and remarkably free from sap-wood. The heart-wood is of a bright, cheerful, rosy color, susceptible of a high polish, and when cut transversely, shows numerous satiny "silver rays." The great drawback to this wood for cabinet-making is its cross-grained nature, which makes it very hard to season properly; but once seasoned, it will prove, although difficult to work, a valuable addition to the list of hard woods now so much used.

There are, then, undoubtedly some reasons why this tree should not be generally planted. It does not grow very rapidly, and will require, even in the best soil, at least a century of growth to attain its full size; nor, so far as is now known, does the wood of *Gymnocladus* possess qualities which render it superior to that of many other faster-growing trees. Still, when the practice of planting artificial forests becomes a more general one in this country than it is to-day, the rule of *mixed plantations*, which nature has established, will be found the wisest to follow; and in mixed plantations the Kentucky Coffee-Tree will find its proper place with the Ashes, Walnuts, Hickories, Maples, and Oaks. As an ornamental tree, the *Gymnocladus* deserves much more attention than it has yet received. For street-planting it is particularly suited. It puts out its leaves very late, and so does not cast a dense shade early in the season, when too much shade is an objection. Its habit of growth, too, with its upright, not spreading, branches, adapts this tree to narrow streets or country roads, where trees with a spreading habit of growth could not find space in which to develop. Its freedom from the attacks of all insects, so far as I have been able to learn, is another advantage, and not a slight one, in favor of the Kentucky Coffee-Tree for street-planting.

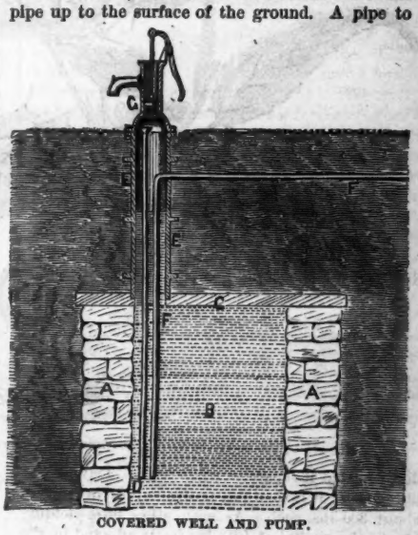
The Grape Vine Raspberry.

It is often the case that we feel sure that a thing is a fraud long before we can prove it to be so. This has been the case with the "Grape Vine Raspberry," the very name of which is calculated to excite suspicion, and we had inquiries concerning it for some time before we could get at its history. One Holland, of Plymouth, Ind., sent out a special circular, headed: "A New and Rare Plant, Grape Vine Raspberry." He says: "A raspberry that resembles the grape vine in wood and leaves. It is purely thornless, and the wood is jointed like a grape vine * * * a very large, sweet, lucious berry, measuring 1 inch in diameter. * * * It is a new seedling raspberry, and makes a rare and very pretty ornamental bush on account of its large leaves, singular appearance, and the beauty of its flowers when in blossom. I control the entire stock"—which he offers at $1 the plant. It is not our custom to advertise nurserymen gratis, but we make Holland an exception, and we advise all who wish to purchase a real genuine "Grape Vine Raspberry," to go to the man who controls "the entire stock," though we do not think that the demand will be large after we have told the whole story. "The Evergreen," a nursery paper, published at Green Bay, Wis., stated that Holland purchased of Pinney & Co., of that place, a lot of "Nootka Sound Raspberry Plants, (*Rubus Nutkanus*), which grow native and wild there," and was selling them as a seedling, and the editor proposed to furnish the same plants that Holland was offering at $1 each, for $8 a hundred! Messrs. A. Hance & Son, Red Bank, N. J., who have a sharp eye for novelties, procured plants of the genuine "Grape Vine Raspberry" from Hammond, and plants of the "Nootka Sound Raspberry" from Pinney & Co., of Sturgeon Bay, Wis. In due time both these flowered and fruited at Red Bank, and they both turned out to be the same thing—not *Rubus Nutkanus* at all, and not to be distinguished from the old "Flowering Raspberry," *Rubus odoratus*. We would not imply that there was any intentional wrong on the part of Pinney & Co.,—they merely mistook one native plant for another very closely resembling it—a thing which may readily happen. This "Flowering Raspberry" is common from Canada to Georgia, and even grows—or did not long ago—within the limits of New York City. As an ornamental shrub we have often commended it, as it has pleasing foliage and large, purple flowers. As to its fruit, Holland is right in saying it is "large," and it is often "1 inch in diameter," but being shaped like a saucer it is all breadth and no depth. It may be "luscious" to Hammond—but tastes differ. If one had an acre of plants, he might get a quart of berries at a picking—then again he might not. We have seen many bushes, but never many berries. Messrs. Hance & Son think that the "Grape Vine" plants seem to be rather larger in the leaves and flower than in the Eastern form of "Flowering Raspberry"—but that the berries are not more numerous or better in quality. Those who wish to grow the "Flowering Raspberry" as an ornamental shrub, can get it at almost any nursery for 25c. If they wish to purchase the same thing under the name of "Grape Vine Raspberry" at $1 apiece, they will now know where to send.

Salt as a Fertilizer.—There is a mistaken idea prevalent that it is contrary to law to use salt as a fertilizer. This is a relic of the war of 1812, when this use of salt, then an imported article, was forbidden as an improvident waste, tending to make it scarce and dear. The tradition still survives, and is occasionally heard of from all parts of the country. There is no law to prevent any use we may wish to make of salt, and as a fertilizer it is not only largely used, but it is very beneficial to some crops. For mangels and field beets, excepting the sweet varieties, and for field crops of cabbages, 300 lbs. per acre may be generally used with benefit, scattered on the soil as the young plants make their first appearance, or are first set out. Salt is frequently useful when mixed with an equal weight of plaster and applied at the rate of 200 lbs. per acre to clover or grass early in May.

A Covered Well for Pumps.

Mr. "W. J. W.," of Staten Island, sends a sketch of the manner in which he arranged his well. This was dug 13 feet deep and 5 feet in diameter; stoning up left the well 3 feet clear on the inside. Over the wall he placed a flag-stone with a circular hole at one side, and from this he carried a 4-inch tile pipe up to the surface of the ground. A pipe to



COVERED WELL AND PUMP.

connect with a pump at the house, and another to connect with a pump at the well, were passed through the tile pipe, and all above the flag-stone filled in with earth, as shown in the engraving, which gives a sectional view of the well. This has the advantage that it keeps out all surface water and other impurities, but it would make it rather troublesome when it became necessary to clean the well, from sand, etc.

Jute and its Culture.

Probably no other fibre can be made to serve so many different purposes as that afforded by the Jute plant, and probably no other can be produced so cheaply. Then again, the demand for it seems almost unlimited; our imports over ten years ago exceeded $5,000,000 annually, but now they must be very much larger. It can be cultivated in all the States south of Virginia. The limit of its profitable culture is not yet ascertained, but perhaps it will be further north than here indicated. There is no apparent reason why we should not raise every pound of jute used in this country, and its culture has been commenced with greater promise of success than has attended the introduction of any other crop new to our Agriculture. This is due largely to the fact that there are factories already in operation for the manufacture of the imported raw material, and one great obstacle to the introduction of a new crop—want of a market—is removed. Then the Agricultural Society of South Carolina has taken an active part in the matter, and encouraged its members to undertake the culture by supplying seeds and giving instruction as to growing and treating the crop. Jute is a native of Asia; its botanical name is *Corchorus capsularis*, and it belongs to the *Tilia* family, which is represented with us by the Basswood, or Linden, a tree well known for its tough bark. The Jute plant is annual, with a stem 8 to 12 feet high, an inch or more through at the base, and branching only at the summit. The form of the leaves, of the small yellow flowers and seed capsules, is shown on the next page. The plant is cut when in flower, tied

in bundles, and steeped in water for 10 to 20 days, during which time all but the fibrous bark is so far decayed that it separates when beaten, leaving the fibre clean; it is then put up for export in bales of about 300 lbs. each. As with other fibre-yielding plants, the quality of Jute is greatly affected by the rapidity of growth, the nearness together of the plants, the time of cutting, etc., the finer kinds being very bright and glossy, and soft to the touch. The great consumption is for the making of bagging material, especially that known as "gunny;" it is used for coarse cloths, carpets, and for cordage, though not sufficiently durable, when exposed, for the latter purpose. The finer kinds are used to make coat-linings and other fabrics, and are mixed with cotton, woollen, and even silk, in certain styles, its employment having greatly increased within recent years. In some parts of India the natives are wholly clothed in cloth made from Jute. The thick ends of the stems, known as "Jute Butts," and refuse of the gunny factories, are used as a paper stock. The Agricultural Society of South Carolina is doing much to encourage the culture; the Secretary has published directions for its cultivation, and has ordered from India a new supply of seeds for distribution to the members. Last year seeds were distributed to 85 farmers, mostly residing in the seaboard counties, and the results reported by them are very encouraging. The larger share of these persons cultivated this first crop for seed rather than fibre, and it is expected that a large breadth will be sown this year. Jute succeeds best on rather clayey land, neither very wet nor very dry; it flourishes perfectly well in the immediate vicinity of the sea, and even where the water is brackish from its influence. The land being well prepared by plowing and harrowing, the seed is sown broadcast from April to June, using 15 to 20 lbs. to the acre, and brushed or harrowed in. Nothing is done to the crop until it is ready to cut, which is in 100 to 120 days from sowing. It is cut for the fibre when in flower, but if seeds are desired, the plants are left later, as the seeds begin to ripen soon after the first flowers fall, and continue to do so until frost. Last year the first roll of bagging from Jute of American growth was exhibited at the S. Carolina State Fair. Recently there has been some talk about

Fig. 1.—THE JUTE PLANT (*Corchorus capsularis.*)

"AMERICAN JUTE,"

a subject that comes up in the papers every few years, and it appears to be discussed to no other purpose than to allow a few speculators to sell at a high price the seeds of a common wild plant under a name that does not properly belong to it. This so-called "American Jute" is the Swamp Rose-Mallow—*Hibiscus Moscheutos.* It has a large perennial root, with stems 3 to 6 or more feet high, broad pale green leaves, and numerous large, pink, hollyhock-like flowers, which in late summer brighten the brackish marshes all along the coast. Like all other plants of the Mallow family, the stem of this has a strong fibrous inner bark, which, could we not do better, might be made useful. We feel very sure that this "American Jute," admitting the excellence of its fibre, can never become a profitable crop, for two principal reasons: its stems can not be produced in sufficient abundance on a given area for a large yield, and its perennial character; the ground once filled with these roots, it would cost about what the land is worth to clear it; if kept long on the same land, heavy manuring will be required, and crowding the stems, often necessary with fibre-plants, is not practicable. We are not averse to trials with this or the dozen other native plants that produce fibres, but we insist that there shall be no mystery or false representation, but the plant shall be discussed and offered as just what it is, and under the name by which it has long been known through a wide district. The "American Jute" fever was at its greatest hight in 1863, when, to show what the plant was, the engraving here given (figure 2) was presented. While it is much under size, it gives a good idea of the flower.

The Old and New in Potatoes.

There appears to be several objects that, no matter how often we may name and describe them, continue to come with the request for the information we have given again and again. The "Oyster-shell Bark-louse" is one of these perennial queries; Katy-did's eggs, another; and the blue-bird does not any more surely mark the advent of spring than does the arrival by mail and otherwise of the old potato with the new one attached—or often found within what remains of the old. The engraving was made from a specimen which showed

Fig. 2.—"AMERICAN JUTE" (*Hibiscus Moscheutos.*)

new tubers both on the outside and within. The phenomenon is so striking that we do not wonder that it excites a desire to know something about it, though, as intimated, it is very far from rare. The potato—the tuber—is a short underground stem, thickened out of the shape of ordinary stems by a large deposit of starch. If the potato be placed in a warm place, vegetation is excited, and its dormant buds, or "eyes," will soon push and elongate into stems, provided it is free to do so; these stems are often in the aggregate several feet long. If we place the tuber in a warm place, and at the same time quite in the dark, where the stems have no room to push, as at the bottom of a barrel—where these strange potatoes are usually found—vegetation is excited as before, but as long stems can not grow, short ones are formed—that is small tubers. The growing shoot, being prevented from lengthening, and forming the ordinary kind of stem, makes

NEW POTATOES FROM OLD.

another kind—the underground form of stem—the tuber. These young tubers—or new potatoes—have grown at the expense of the old, as that will be found shrunken and wilted. This tendency was formerly employed in Europe to produce new potatoes in winter. Potatoes of the previous year were found to be best; these were kept all through the summer by spreading in a cool place, and removing such sprouts as appeared. At the approach of winter these were placed in boxes of earth, stacked one upon another—darkness being essential—in a warm place. In due time that which we have described took place; new potatoes appeared, small and of poor quality, but still *new.*

Root Crops.—The season for sowing roots, lasts from May to September, and during the four months intervening a variety of crops may be sown. The first in the season is mangels, of which there are several varieties. The smaller kinds of these, although they do not yield so heavy a crop as the larger kinds, are more desirable on account of their higher feeding value. Several yellow-fleshed varieties of mangels, have been introduced of late, which are very promising for our climate. Webb's Yellow Kinver Globe, and the Yellow-fleshed Tankard, are the most popular varieties of these. The flesh of these is less watery and more solid than that of the Mammoth Red. Sugar beets furnish the second crop, and may be sown as late as June, of these, Lane's Improved, and Vilmorin's Improved Sugar, are the leading varieties. Red or Blood beets may also be sown in June, and furnish an excellent food for milch cows, as they have the effect of contributing some of their high color to the cream and butter. Carrots and parsnips will be rarely grown, on account of the expense of harvesting them, while beets, sugar beets, mangels, and other shallow rooted bulbs, can be grown with less labor and greater profit. After beets, ruta-bagas may be sown in June and early in July, and in August white turnips may follow. With so large a choice of roots, there is no reason why press of work should come in the way of growing this valuable crop. When roots have once been grown successfully, there is no need for advice to raise them, but only to mention the newer or improved varieties. Where as yet they have not been grown, a trial of an acre or less, with good care, will surely be well repaid, and will serve to establish the practice for the future.

Hardy Ferneries and Rock-Work.

The numerous inquiries as to the construction of hardy ferneries are especially welcome, as they indicate a diversity of tastes in gardening matters, and show that the number of those is increasing who can see beauty in plants as well as flowers. For the successful cultivation of many ferns, if not the majority, an artificial rock-work is necessary, and a rock-work or rock garden allows of the cultivation of, besides ferns, a large number of plants classed as alpine. First, as to the rock-work; much of it is literally rock-*work*, and very bad

Fig. 1.—WRONG.

Fig. 2.—RIGHT.

work. Nothing can be more out of place than a pile of stones upon a lawn—like an eruption upon a fair face. A rock-work should never be made for the sake of the rocks. Monstrous things are built up with stones and cement, with pockets to hold soil; plants, without reference to their native localities, are set upon it, and the whole left to frizzle in our hot suns. A rock-work is needed merely because it enables us to grow certain plants better than in any other manner, just as we give some plants the wettest available spot, so we give others the rock-garden, that they may feel the more at home. The rock-garden, being as far as possible from the formal and artificial, should not

Fig. 3.—ROCKS NATURALLY PLACED.

be in the flower-beds or upon the lawn, but in some nook or corner where such a wild spot might naturally occur. Many suppose that rock-plants, including ferns, must have shade. This is not essential, as such plants vary greatly in this respect, and many of the finest species, in their native alpine homes, are exposed to the full sun. The peculiarity of those plants which flourish best on the rock-work is, that they have long fine roots,

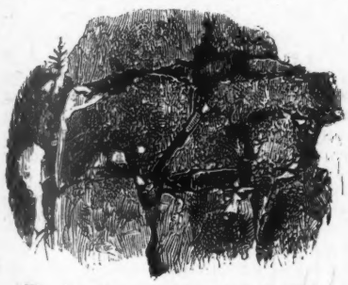


Fig. 4.—ROCKS ARTIFICIALLY PLACED

which find their way down among the crevices of the rocks, where they are not affected by drouth—in fact, plants which really need a mulching of stones. In constructing a rock-garden, one must avail himself of the materials at hand; if weather-worn, lichen-stained and moss-covered stones are to be obtained, they will be all the more pleasing. No rule can be given as to form and arrangement, but if one is in a rocky district, follow as near as possible the natural arrangement of the rocks of the neighborhood. Rocks of various sizes, from as large as one's fist, up to the size of a barrel, may be made useful. A flat, unbroken rock is of little use to the plants in question. It is the crevices between the rocks that gives the rock-work its value. The boy's description of making a cannon —"they take a long hole and pour melted iron around it"—applies in a measure to rock-work; we want many long holes with rocks around them, and we also want those holes filled with earth. The essential point to be observed is, to have all crevices or spaces between the rocks in full communication with the earth. Whether a large or small body of earth, a mere crack or a "pocket" is to hold the roots of the plants; the roots should find earth all the way down, until they reach the surface of the planet itself. In this case the earth is always kept from drying out by the ascent of moisture from below. Another point is, that the crevices be so arranged as to receive the rain that falls. In his excellent work on "Alpine Plants," Mr. Wm. Robinson, editor of "The Garden," London, Eng., gives some instructive illustrations of the manner in which rock-gardens should be constructed, and he emphasizes his teachings by showing how the work should not be done, as well as the proper method. We here reproduce some of his engravings. Where, as may sometimes be the case, rocks are so placed as to leave the fissures in a nearly horizontal manner; if these are as in figure 1, the plants will fare badly, as they are put in places of safety where no rains can reach them. The right method in such cases is shown in figure 2. In figures 3 and 4, by the same author, we have the right and the wrong methods of treating rock-work; in the first (fig. 3) the rocks appear as if nature had placed them there, while in figure 4 the artificial character of the structure is manifest. A rock-garden may be a simple affair, or if one has the means it may be an extensive structure, with ravines, defiles, chasms, cascades, caverns, etc., and the work referred to gives some illustrations of what may be done if one has the means to expend in this direction. Of course we have in view only an inexpensive structure, if it can be so termed. The appearance of an unpretending rock-garden, when the rocks are made to appear as if a natural out-crop, is given in figure 5, from the same author, who in figure 6 shows how an old stone wall may be utilized and converted from an encumbrance into a pleasing feature. If one is so situated that a rock-work of even the simplest form is not practicable, the cultivation of alpine and rock plants need not be abandoned. As already stated, one of the principal reasons why certain plants grow better on a rock-work than elsewhere —some even refusing altogether to flourish in the ordinary border, is the protection afforded to the roots, and this probably consists as much in preserving a uniformity of temperature as a sufficient moisture. These conditions can in many cases be met by setting the plant in the border, and then placing around it a broad, low mound of stones, extending several inches from the plant. The soil is of quite as much importance as the rocks themselves. In no case should it be of a kind to pack hard or to bake; woods-earth or peat, with an abundance of coarse, sharp sand, will approach in character to the soil of their native homes. Mr. John Robinson, Salem, Mass., in his

Fig. 5.—A SMALL ROCK GARDEN.

admirable work on fern culture, shows how easy it is to those, who care for the plants, rather than for a pretentious place to grow them, to have a fernery, even within the limits of a city yard. We give a portion of his illustration of his fernery (figure 7). A rough wall was built of loosely piled rocks, about two feet in front of the boundary fence, also of stone; the space between was filled with suitable soil, which found its way into crevices among the rocks. The large ferns were planted at the rear, the smaller in front and in and among the "pockets" of the rough wall. When the boundary fence is of wood, a rear wall would have to be built also. The

Fig. 6.—AN OLD WALL USED AS A FERNERY.

rock-garden being provided, it is to be stocked with plants; it may be devoted to ferns only, or to alpine flowering plants. In either case one will find in the vicinity a large number of plants suited to such situations, and the rambles in search of them, the finding, the bringing home and planting will bring a foretaste of the pleasure to be derived in caring for them in after years. If impatient for an immediate effect, and unwilling to await the slow process of gradually transferring here the results of one's own collections, there are establishments where "Alpine Plants," including our choicer native species, are to be had at moderate prices. Such plants may even be cultivated in pots, by making each pot a miniature rock-garden.

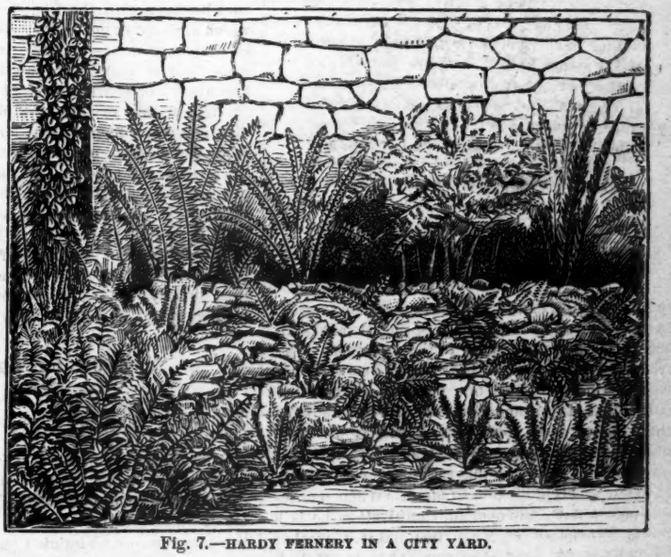


Fig. 7.—HARDY FERNERY IN A CITY YARD.

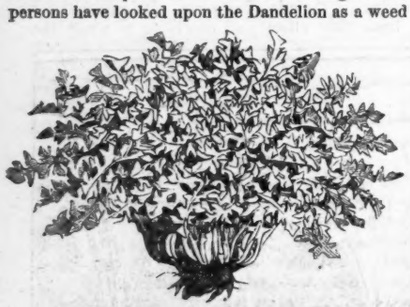
Another Tree Label.

In former volumes we have given a great variety of devices for labelling trees; indeed, only last month (page 143) we called attention to one of the simplest and, so far as permanence is concerned, one of the best. The chief, if not the sole, fault of the zinc label described last month is, that it is not conspicuous; it is not readily seen upon the tree, and, when found, the writing, though thoroughly indelible, is faint, and requires close looking to read it. Orchards, as a general thing, need no labels—the position of the tree should always lead to its name in a record: but where one has a small collection, or grafts several kinds of fruit for trial upon one tree, it is very desirable to have a conspicuous label. Paper labels, printed in clear type, and enclosed in a metallic frame with a sheet of mica in front, are to be purchased, but they are expensive, and limited to the common varieties. We have seen in some foreign journal or catalogue a label printed upon paper, placed in a glass tube, the opening to which was then hermetically sealed (by melting the glass), and provided with a wire to hang it by. A correspondent, "*Pro Bono Publico*," gives a modification of this which is simple, practical, and not expensive; the engraving shows it at about half size. The vials, known to the druggists as "tube vials," cost by the gross about $1.60; the label may be written or printed; sound corks should be used, and large enough to require some pressure to force them into place, and the sealing should be done thoroughly. There is no reason why a label thus treated should not last indefinitely, if not broken. One precaution should be observed: if a label of this kind is prepared and sealed up on a damp day, the chances are that in time a minute fungus or sort of mould may appear on the paper, and disfigure it; this may be avoided by having all parts perfectly dry before sealing. The vial may be as large as one chooses, but the risk of breaking is greatly increased with the size.

LABEL.

Now Sow Your Dandelions.

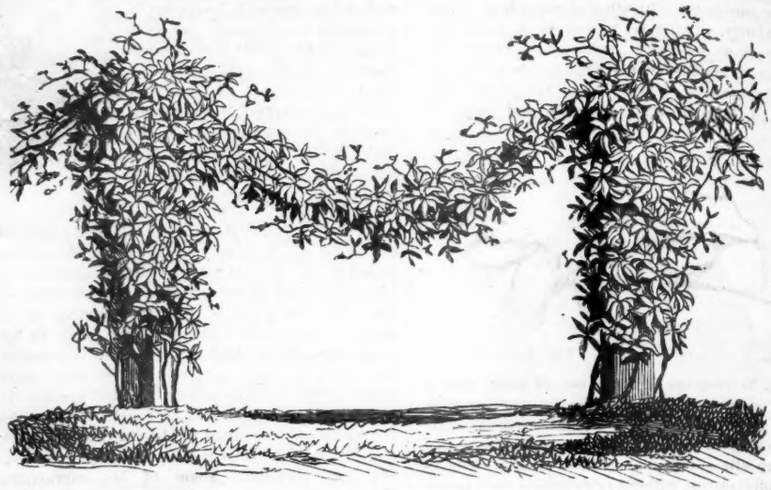
No doubt that many will wonder what brand new wrinkle is implied in the above heading. Most persons have looked upon the Dandelion as a weed


THE NEW DANDELION.

to be got rid of, and rather better than most weeds, as when cut up by the root in spring it makes an acceptable accompaniment to the salt meat. The readers of the *American Agriculturist* are aware that we have on more than one occasion advised the cultivation of the dandelion—not indeed by sowing the common weed, but an improved kind. This was referred to last month, on page 144, in an article on "Greens," and now that the time for sowing is at hand, we bring it again to mind. When one introduces a new vegetable into cultivation, he is a public benefactor, so when one induces another to cultivate a vegetable new to him, though old to cultivation, he is a private benefactor; by enlarging his knowledge of the good things of the world, and inducing him to try even but one of them, that man's comfort and enjoyment of life is increased. The fact that the dandelion is a weed, is no argument against its cultivation; parsnip and carrot are vastly worse weeds, yet we go on cultivating them. If one is fond of dandelion at all, he should cultivate it, for two reasons: he can cut a bushel in less time than he can hunt up a quart in the fields, and is as much superior to the wild as a Savoy is to a common Drum-head cabbage. If we mistake not, we are indebted for the improvement—or, as the French have it, "amelioration"—of the Dandelion, to one of the Vilmorins of the world-renowned horticultural house of Vilmorin, Andrieux & Co., Paris. This is by no means the only improvement with which the name is connected, but this deserves the thanks of the world. In the course of improving the Dandelion, three useful varieties were established, the Large-leaved, the Thick-leaved, and the Curled-leaved, which have been in cultivation for several years, and this year the French journals announce still another, the "Very Double" (*a cœur plein*), Vilmorin's engraving of which is here reproduced. The French use the Dandelion almost solely as a salad; it is blanched by covering the leaves, usually with earth: in a few days they lose their green color and nearly all of their bitterness, and come out white, crisp, and tender. This new variety appears as if especially adapted to this treatment, and it remains for us to try if it is superior to the older kinds as a pot-herb. Our experience has been with the Long-leaved, the seeds of which are kept in our leading seed stores. Nothing is simpler than the culture. Sow this month in rows two feet apart; thin, when large enough, to a foot apart; or sow in a seed bed, and when large enough, in June or July, transplant to rows at the distances above named; this method is but a trifle more troublesome and is greatly saving of seed. Keep clean, and encourage the growth all summer, to get as strong plants as possible; when used as salad, it is blanched in September or October; when grown for greens only, it is better when the ground freezes to lay some straw or litter along the rows. The next spring the litter is removed from directly over the plants, but allowed to remain between them, as it will keep the foliage clean.

A Use for Vines.

It is sometimes desirable to mark a boundary or division line when neither a fence nor a hedge is desirable—as, for example, between the ornamental portion of the grounds and those reserved for the vegetable garden or for the clothes-yard. In such cases a most pleasing screen may be formed by the aid of quick-growing vines, the best of which for this purpose is our Virginia Creeper. Strong posts of suitable hight should be set 8 or 10 feet apart, and several vines planted at the base of each. Chains of sufficient length to form graceful festoons are to be carried from post to post, and as the vines grow they are to be trained upon them. The effect of such a screen is only partially conveyed by the engraving, as it shows but a single member. This method is used with fine effect in Europe for training Ivy, and is to be commended to those of our readers who live where that finest of evergreen vines is hardy. We have seen, somewhere in the suburbs of Boston, the Virginia Creeper trained in a similar manner from one tree to another; the effect would no doubt please the majority, but for ourselves, we do not fancy anything done to a tree that suggests mutilation, and as the fastening of chains does this, we prefer to leave it undone.


PORTION OF A SCREEN OF VINES.

Poultry Proof Fences.

That chickens are most useful in a garden, but that hens and horticulture are not compatible, every one with much experience will maintain. The better way is to fence *in* the poultry, but it sometimes happens that they must be fenced *out*. If one is to build a garden-fence, the possibilities of poultry will be borne in mind, and provided against; but most

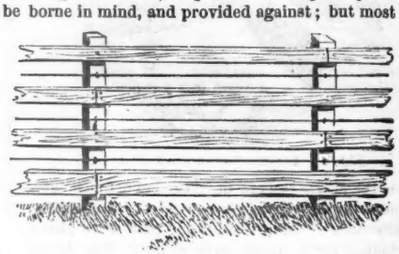


Fig. 1.—FENCE WITH WIRE.

frequently the fence is already built, and in that case is usually excellent for keeping out almost every thing except hens, the very thing for which a fence is most needed. The accompanying engravings are from two sketches by L. D. Snook, Yates Co., N. Y., and give methods of so changing the common board fence as to make it serve for fencing in or fencing out fowls. In fig. 1 the space between each two boards is practically closed by stretching a galvanized wire midway between—No. 10 being sufficiently heavy; should the lower board be too far from the ground, the space may be closed by another board, or diminished by the use of a wire as may be best. In fig. 2, the same end is accomplished by the use of slats nailed to the fence-

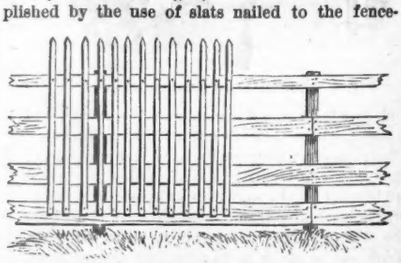


Fig. 2.—FENCE WITH SLATS.

boards. Common laths may be used as a makeshift, but it is better to use regular fence-slats. If

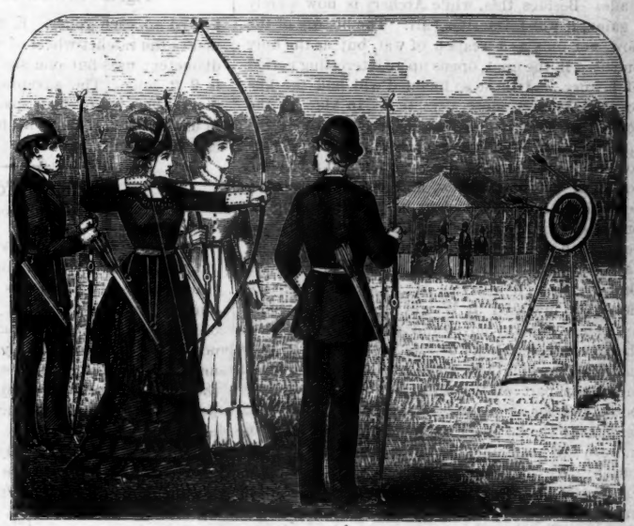
the fence is too low, its hight may be greatly increased by allowing the slats to project above. If slats have to be sawed for the purpose, they should be of stuff fully half an inch thick, and cut two inches wide—or wider if desired. The ordinary slats are two and a half or three inches wide, and if placed upon the board fence at their own width apart, form a very serviceable barrier.

Thermometers.

If a thermometer is only to show us the temperature of the air, whether out-doors or in, it makes but little difference how it is mounted, provided it is properly secured against accidental breaking. But we often wish to have water or other liquid at a given temperature; it is impossible, especially in warm weather, to churn properly and not know the exact condition of the cream, and other cases are occurring in which the thermometer must take a part. For these varied uses the old style of thermometer will not answer, on account of the difficulty of properly cleaning it, if for no other reason. A quarter of a century ago we used to know in the laboratory what was called a "chemical thermometer," a costly instrument, to be used with special care not to break it. The thermometer, scale and all, was completely enclosed in a glass tube; this could be placed in boiling acids and other destructive liquids, and remain uninjured; a rinsing in water perfectly cleansed it and made it ready for another use. Within a few years the costly "Chemical Thermometer," or one of precisely the same construction, has been offered for common use at an astonishingly low price, and while it can serve every purpose of the common thermometer, it may be used in many cases in which that can not be, and there is no reason why it should not come into general use, as it will serve every purpose to which a thermometer can be put. The engraving shows one of these instruments. The bulb and tube filled with mercury are as in any other thermometer; the graduated scale is upon paper, and attached to the tube of the thermometer; the whole is then enclosed in an exterior glass tube, all save the bulb, which is in part or in whole exposed. The outer glass tube or case is closed above, and has a ring to admit a cord or wire by which to hang it up. Those offered for sale, like other styles, have a very narrow range, or very long one, according to the uses for which they are intended. Having watched the makers of common thermometers, and knowing how many times more difficult it is to make one like this, we are utterly at loss to know how such an instrument can be made to retail for a dollar. Indeed, the Dairy Supply Co. sell those for use in the dairy, equally well made, but with shorter range, for 75c. Of course, common thermometers, mounted in wood, may be sold for 25c.—but these glass encased ones require great skill to make them. When the retailer and the importer have had their profit, when the duty is paid, and the merchant upon the other side gets his profit, we wonder how much of the 75c. gets to the poor workman, who wears his life away over the blow-pipe.

The Cultivation of the Quince.

To judge from our correspondence, there is a newly awakened interest in Quince culture. Some ask for books upon the subject, and others inquire as to the probable profits of a Quince orchard. There is not enough to be said on the subject to require a special volume; the standard works on fruit culture—Barry's, Thomas', Downing's, etc.—each give the needed instructions. We have no data from which to give the probable returns from an acre in Quinces. The attempts at anything like proper cultivation have been comparatively few; but, judging from the prolific character of a few trees of our own, and the price which really good fruit brings in the market, we have no doubt that, take a series of years, the Quince will be found quite as profitable as any other orchard fruit. Quinces bear so well, in spite of bad treatment, that it is a popular notion that neglect suits it best. This is a great mistake; there is no fruit that responds more promptly to good culture, and we would advise no one to undertake the cultivation of quinces unless they intend to *cultivate* them. The land should not be a low, wet, out-of-the-way piece, good for nothing else, but such soil as will yield good returns of any farm crop, and it should be put into good condition by manuring and plowing. There are two methods of training the Quince—or, rather, one method, the other being the absence of training. It is advised by some to allow the tree to grow in a bush form, with several stems from one root. The alleged reason for this is, that if the borers destroy one stem or trunk, there will be others left. The proper method is, to grow the Quince in a tree form, with a clean trunk and regular head; then the borers can be kept out, or killed if they ever get in, a matter well nigh impossible when each tree presents a thicket of stems. It is true that it is some trouble to form a head, but it has to be done but once, and the advantages warrant it. The soil being well prepared, set the trees at 12 feet apart. The first step in forming a head is to get a stout stem. If the young trees are weak, it will be better to cut them back severely and secure a new growth. The object should be to get a strong stem, at least an inch in diameter, upon which to form a head. If the stem is weak, give it a stake. Look out for borers, the presence of which is readily detected, as the bark is so smooth. Allow no suckers to grow. As to varieties: the best known and most generally cultivated is the Orange, also called the Apple Quince. The Pear-shaped Quince is preferred in some markets, but it is not so good a bearer. Rea's Seedling has been very satisfactory with us; it is a fine large fruit, and the tree bears well. A quite new variety, the Champion, which originated in Connecticut, promises to be valuable and worthy of consideration.



AN ARCHERY PARTY.

THE HOUSEHOLD.

☞ *For other Household Items see "Basket" pages.*

What Exercise do Your Boys and Girls Take.

There are Gadgrinds of both sexes who may say that "my boys get enough exercise in doing the chores all the year, and as soon as spring opens they can get it behind the plow and harrow, or, later, in the hay and harvest fields; they are tired enough with the exercise of their work." As to the girls, it may be said: "The daily routine of the house, the sweeping and dusting, the table setting, and the dish-washing, give a plenty of exercise; but if they need any more they can help on washing days, and find a use for all their strength."—We would not say that the ideas implied in these answers are the rule, but that it is far too generally the case that mere work is looked upon as exercise, and that it will at all answer for or accomplish the purpose of exercise as *recreation*. For exercise to be beneficial it must not only be of a kind unlike the usual daily occupation, but it must have the co-operation of the mind. Mere muscular movement, that is not work, but made solely for exercise, without engaging the mind also, is of very little use. Many years ago the writer lived in the city, and in that portion of it where there were numerous (and very high-priced) schools for young ladies. In these schools a part of the regular programme was the morning and afternoon walk. These girls went out in pairs, the youngest in front and marshalled by two or more teachers. One teacher at the "head of the column" regulated the pace, the other at the rear kept an eye on all in front of her. To see these poor girls, each pair at a stated distance from the pair in front, and fated to look at their shoulders—for looking to the right or left would be seen by the "rear guard" and reported at headquarters; to watch them as they moved along at a snail's pace—the pace governed by that of the smallest child—up one street and down the other, and back home—this done morning and evening, day in and day out—seemed to us a most melancholy burlesque upon exercise, and was probably as near the real thing as the mental cramming which the poor girls received did to education. If those girls could have had only a city back-yard where they could have taken exercise *as they pleased*—without the horrid formality of these walks—what a difference. We hold that exercise is of little value that works the body and neglects the mind. The side-walk promenades referred to presented only so many squares to be walked around. Suppose that the same distance had been accomplished in the country, with at the end a locality where Bluets, wild Violets and Spring Beauty could be gathered! It being admitted that the mind shall be concerned as well as the body, if we would have useful exercise, the question presents itself how can this be best accomplished. The utility of rambles, with flowers as the object, has been alluded to, and other branches of natural history offer the same advantages. But it is desirable to have exercise and recreation nearer home; something that requires little or no preparation, and at the same time something in which the boys and girls (both old and young), and those of the neighbors, too, if need be, may join. It was because it offered all these that Croquet acquired its popularity so suddenly, and retained it so long. It not only is a social exercise, but, in requiring some skill, occupied the mind in the endeavor to accomplish something—to get the better of the opposite players. But, like all good things, Croquet has had its day, and there is a desire for something new. In England, the leading out-door games, besides Croquet, are Lawn Tennis and Archery. Lawn Tennis, probably for the reason that it requires considerable preparation and some one who knows the laws of the game to instruct others, seems to have taken very little foothold in this country. Archery, on the other hand, is yearly increasing in popularity. As affording exercise for both body and mind—as being a social game, admitting of any number of participants—as a home game, one that is possible on the lawn, or elsewhere close at hand—as a game

for which the outfit is not costly—it, in fact, meets every possible requirement in a family game that shall furnish recreation, that shall be as far removed from work as possible, and to be participated in *because*, and for that reason only, it affords healthful exercise for both body and mind. The kind of exercise afforded by the use of the bow is unlike that in most other out-door amusements; it brings into play the muscles of both arms, and aids in developing the chest, and leads to an erect and graceful carriage of the body. An archery party, as shown in the engraving, is attractive to the spectators, as the outfit and the positions taken by the players are exceedingly picturesque and pleasing. We have frequently referred to the mental exercise, holding that to be quite as important as the other. Archery affords this in an unusual degree, for, besides the excitement of rivalry, the desire to excel another, the conditions of success must be considered, and this will lead those who desire to excel to consider under what conditions the best shots are made. Besides this, while Archery is now merely a game, it was formerly an art. The history of the bow, not only as a weapon of war, but as the only one used in the hunt, opens up an interesting period of history, and those so inclined will find the history of Archery most attractive. In view of the revival of Archery—in fact, it promises to be the coming home exercise or game—a number of persons have been at work devising new and attractive forms of the bow, arrow, and other accessories. Several of these new designs in Archery have been presented to the Orange Judd Company, no doubt because they are widely known as agents for Crandall's Blocks, the most popular toys of the age. One of these new styles of Bows and accessories—that invented by Wright & Thorne—seemed to possess so many novel and useful features that they have undertaken the sale of them. The particulars in which the bow—of course, the most important part of the outfit—differs from other bows, and the accessories were shown last month, on next to the last page of the cover, and are given more in full in a Catalogue which is sent upon application. We may suggest that, besides the home exercise of Archery—and we believe in home amusements before all others—the formation of Archery Clubs, to meet at stated times, to adopt some simple uniform, and to exercise for some inexpensive prize. Such clubs greatly conduce to good feeling, and as they create a community feeling, make better neighbors. Let our young people try Archery.

A Compact Quilting Frame.

It looks as if there might be a quilting mania, from the receipt in quick succession of three designs for quilting frames. These designs are essentially the same—varying in unimportant details only

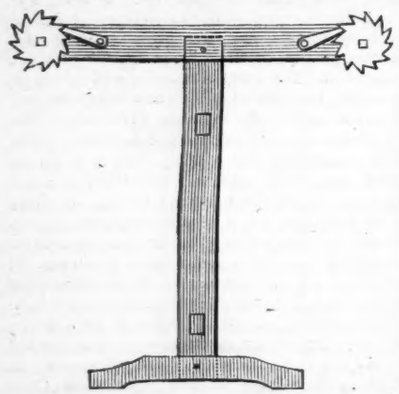


Fig. 1.—STANDARD OF QUILTING FRAME.

—and appear to be an improvement upon any of the numerous frames we have published. Having several to choose from, we accept the one that has come the greatest distance—that by George Linfield, Washington Co., Oregon. The frame is supported by two standards or end pieces, one of which is shown in fig. 1. The upper horizontal portion is 30 in. long, and of 2 by 3-inch stuff; between this and the foot is an upright 30 in. high, with two mortises for the slats. There are two slats, 7 ft. long and 1 by 3 in.; each end is cut to form a tenon, which passes far enough through the upright in fig. 1 to allow of a ½-inch pin; when the slats are in place, and the pins driven in, the whole is very firm, and may be moved about if desired;

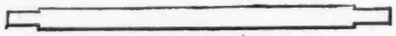


Fig. 2.—SLAT TO JOIN STANDARD.

the lower slat answers as a foot-rest for those working at the quilt. The two rollers, fig. 3, may be round or 8-sided, 7 ft. long and 2 in. through; one end has a round bearing 1¼ in. diameter; the other end has a similar bearing, and beyond that is an inch square, to hold the ratchet-wheel shown in fig. 1. The ratchet-wheels may be of hard wood, 4 in. diameter and an inch thick. A strip of cloth is

Fig. 3.—ROLLER TO HOLD QUILT.

tacked to each roller. E. S. Hallett, of Indiana, makes the ratchet-wheel of sheet-iron, and 5 in. in diameter; uses but one slat, which with the roller is 9 ft. long. The advantage of this frame over most others is the small space it occupies, whether in use or not. If the work is interrupted, the quilt can be rolled up on the rollers and set aside.

Home Topics.

BY FAITH ROCHESTER.

More Baby Talk.

After all, there is nothing connected with the Household so important as the proper nurture of our children. I need not apologize for coming back to the subject so often. How can I help it now, when my arms and my time and my heart and mind are chiefly occupied with the care of one of the sweetest and cunningest babies that ever came into this world? All mothers will understand this language, which no doubt seems extravagant to others. A bachelor friend of the family called here the other day, and was surprised to find what he called "a little stranger" among us. I pitied his ignorance of babyhood. But it was not a willing ignorance, for he asked some curious questions on the subject—wanted to know if the fourth or fifth or sixth baby in a family seemed just as wonderful and delightful to its parents as the first child. I was glad to bear testimony to the goodness of God, for how dreadful it would be if this story of human life and love did ever grow old and wearisome. It is a part of the Lord's great mercy that to loving parents, each infant added to the flock, is a fresh wonder and source of tender admiration. Sometimes our hands are so full and our strength is so little, that we do not see how we can possibly do or bear any more as mothers; and we could not, if the baby itself did not awaken such a fresh fountain of love for its own sweet helplessness as gives us new energy and courage—new physical strength too, in many cases. Let me say plainly that I believe parentage, under healthy and happy conditions, to be decidedly wholesome for women, physically, mentally, and morally. It is good for men, too, and a pure and wise fatherhood is quite as necessary for the welfare of the human race as a good and loving motherhood. Fathers ought to see a good deal of their little children; ought to share to some extent in the real daily care which infancy entails upon some one. Babies are costly treasures, and some one must very frequently attend to their various needs, and one who does this with loving attention, is sure to reap a blessing. The experience is so new and wonderful to the young parents of a first child, that they fancy the delight comes largely from its novelty. But there are added elements of pleasure as other children come along. The wonder of the little brothers and sisters is a pleasant thing to see. It seems to me that children who are led to believe that the doctor or nurse brings the baby to its mother, cannot possibly love and reverence it as those do who believe that it has come from Heaven as one of God's most precious gifts—came to mamma's bed in the night, as the youngest one thinks—grew naturally in God's appointed way as the elder ones have heard, as the flowers and fruits each grow in their own heaven-appointed way. It pains me to think of the falsehoods other mothers have told their confiding children about our precious baby, and I can hardly wonder at the indignation or contempt which better-informed children feel for these false stories. I think it important, however, as we give truthful answers to our children's inquiries, that we caution them not to talk on such subjects with any but their parents. A very little correct information satisfies most children, and the subject is easily changed.

Baby's Nights.

One of my late letters of congratulation, lacks a little pity in some of its lines. It comes from a mother of only one child. She says, "I have no doubt the little one has found a warm welcome in your heart, but I think of the tired and already overtaxed mother, and wonder if strength sufficient will be added to carry you safely through the next two or three years of wakeful nights and baby-tending days. Or do your babies go to bed and sleep all night like grown folks. Mine didn't, and we are making up now for lost sleep."

I have not forgotten my experience with my first baby when he was the only child. We either kept a lamp burning all night or lighted one whenever anything was the matter with the little one. This was all unnecessary and has never been repeated in this family. The present baby has slept in a dark room every night since he came here, and since the first week no lamp has been lighted on his account. A maple "chunk" has burned slowly in the stove all night until this week (early in March), but a window has been kept open nearly every night. He is usually sound asleep soon after 7 o'clock, often earlier, and does not wake again until after midnight. He sometimes goes off into this sound sleep while nursing, and sometimes is rocked to sleep. The little grunts and squeaks he makes, stretching himself as he gradually wakes up with hunger in the night, awake me, so he does not arouse any one by crying. Here, it has come to be considered, by father and mother both, as quite undesirable for both parents to occupy the same bed with baby. No bed is wide enough for this, and a crib for baby alone is not the best place for him in winter. So it is never necessary to have him sleep on my arm except when feeding him, and quite unnecessary to keep a warm room, as he does not have to be moved from under the warm bed-clothes. Usually no change of garments is required as he is dressed for the night with sufficient protection to carry him through. If he gets uneasy about it, however, his "under-clothes" can be changed without uncovering mother or child, if you have the napkins carefully folded ready for use and laid near, so that you know just how to open and use them in the dark. These quiet nights are worth trying for, and to secure them, the mother and child should not be crowded, the room should be well ventilated and reasonably quiet, and the baby should never be taken up in the night or exposed to the lamp-light unless it is absolutely necessary. When an infant has to be fed with a spoon or drink from a cup, the case becomes more difficult, but let everything be done with as little fuss as possible. If the mother can nurse the child at all, if her milk is healthy but only insufficient in quantity, the child need not be weaned entirely, but have two or three additional meals, and none need come in the night.

Bread that is Sweet.

"I don't know what you mean by *sweet* bread," said the hired girl; and she didn't. Her bread was well kneaded and very light, but never really sweet and sometimes sour. That bread shall taste sweet, is one of my household hobbies, perhaps. I hear bread praised as very nice, which seems to me quite poor, because it lacks this essential quality. Sugar will not give the desired sweetness, and surely soda cannot. In the wheat itself is the saccharine principle—all the sugar that is needed to make our bread palatable or nutritious. All I ask is that the wheat when ground into flour or meal shall not be so prepared as food, as to lose all of this natural sweetness. It is less likely to do so, if the flour—

at least a part of it—is scalded by boiling water before the yeast is added. Of course the mixture must be below scalding heat before the yeast is put in. But bread loses its natural sweetness by being allowed to rise too long. Sweetness is sacrificed to lightness. We should do our best to secure both. In common baker's bread we have "a stone," or at least chips, when we ask for bread. Much nourishment of the wheaten flour has been fermented away during the rising of the bread. The only thing you can taste, in many cases, is the salt. Indeed, the natural delicious flavor of many grains and vegetables is almost wholly concealed by the too free use of salt in our food. Lately, while having my food brought to my room, I grew very tired of the salted white bread, and the yeast graham bread sweetened artificially, and I told my little daughter about a new kind of bread described in a late journal. Her little hands followed my directions with success.

Graham Sticks.

Mix together, and knead very thoroughly, not making the dough too hard, graham flour, sifted or not, as you choose, and cold water. Roll into pipe stems, and bake in a hot oven. That is all. The presiding genius of the kitchen looked on in wondering amusement. She said they could not be light without yeast, or soda, or baking powder, or something to *make* them light; and they could not be good without salt or sugar, or something to flavor them. But they were light, and they were good, and every one was eaten with pleasure by the members of the family. They needed good chewing, but that gave us a chance to discover their full sweetness. No doubt they would be improved by the use of sweet milk as "mixing," instead of water, like the graham crackers we make. After feasting on these "sticks"—I know how absurd this sounds to people who dote on "good living," concerning which "more anon"—I could not go back contentedly to yeast bread; so I called for graham gems, and gave the girl directions for mixing them with water—nothing but the graham flour and cold or lukewarm water. I told her to mix the batter a little thicker than for pancakes, so that it would pour out thick and chunky from the spoon, thick enough to pile up a little on the pans, but thin enough to level itself down directly. I was afraid her skepticism would affect the gems, but when she brought me some for my breakfast, they seemed the sweetest bread that I had tasted for some time. So long as we kept a cow, I used either sweet or sour milk for mixing gems, and it has never seemed easy to go back to water gems. But now I eat them with gladness, and hear them called for by the children when they are hungry, and see them eaten without butter or dressing of any kind, with evident relish, as other children eat their cookies. The gem batter must be beaten or stirred very thoroughly, put into hot gem pans, and baked quickly in a *hot* oven—hot when the gems go into it. Those who have not tried these gems, or perhaps have never heard of them, may need to be told that they are best when fresh and warm, but old gems may be made about as good as new by dipping them into cold water, laying them on a plate or tin, and heating them through in the oven. Never cut open hot gems, but break apart.

Soreness of the Feet.

About a year ago, I wished to make inquiry somewhere how to cure soreness of the larger joint of the big toe. Help came in the way of a hired girl, and this gave a chance for more rest, or only a moderate use of the feet. I thought the case was so bad that some outward application must be made, but mere rest was the only thing needed. Since then, care has been taken that no seams of the shoe come over that joint.

A Pretty Rug.

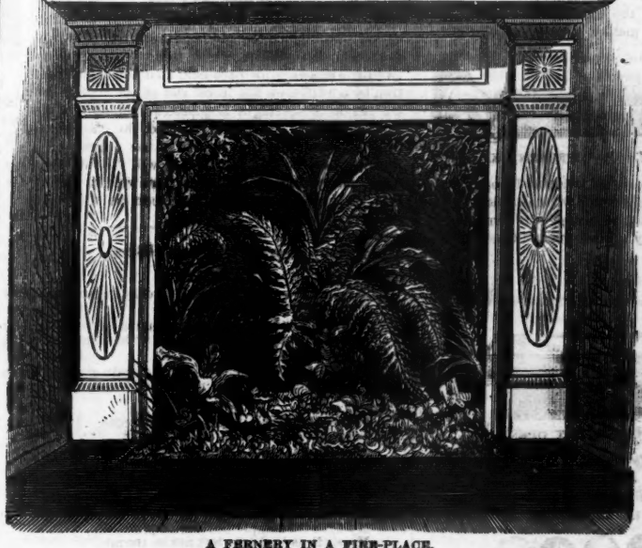
A correspondent tells me of a rug she has lately made of carpet and old pantaloons. She says: "Take an old sack, three feet long and two feet wide; then a piece of narrow striped stair carpet, eighteen inches long and ten inches wide, fastened in the center. Fill out the sack with pieces of the old pantaloons; cut two inches long, inch and a half wide, and rounded at two of the corners, sewed on to imitate fish scales. For a finish, at the edge of the carpet make a double fold of some bright cloth." This fold is put on where the scales join the carpet, I suppose.

Showy Tarts.

The same correspondent tells me how she puts her tarts together. Roll the crust thin, cut with a cake or biscuit cutter, making three thimble holes in half of the crusts. When preparing them for the table, put the jelly on the plain crusts, and lay one of the perforated crusts on top of each. The jelly fills the holes.

The Fire-Place in Summer.

A fire-place, large or small, may not only have its unsightliness covered, but it may be made an attractive and beautiful feature of the room by converting it into a fernery. It is well, to prevent all injury from water, to have a shallow pan or tray made of galvanized iron; this should fit the floor of the fire-place, extending as far forward upon the hearth as may be desirable, with its edges turned up all around for about two inches. This is the only expense attending it; all the rest is to be furnished by the woods and fields, and is vastly more easy to



A FERNERY IN A FIRE-PLACE.

those who live in the country than to dwellers in towns—though these, if they have a taste for rambling, will find a way to accomplish it. Moss-covered rocks are preferable; these are to be disposed in a natural manner; woods-earth is to fill every crevice between and under the stones, and fill the pan. Bring home ferns of all kinds as soon as they show themselves, taking up good clumps of earth with them. Place the kinds known to be tall-growing at the rear, the smaller in front, disposing them in an informal manner. Then cover all of the earth with sheets and tufts of moss to make a complete carpet of green. If in getting the moss some of the low plants, such as Partridge-berry and the like, are taken up, all the better. If the fire-place admits of it, arrange some kind of shelf or support within the chimney and *above* the opening, upon which may be set pots or fruit cans of Ivy and other vines, which may hang down naturally, or be trained along the mantle-piece. The engraving of an old-fashioned fire-place thus treated will give an idea of the plan. Most ferns love shade, and if supplied with water, will flourish; when any are found not to like it, replace them by others. The sole care will be watering; let the soil be moist at all times; but never *wet* and muddy; water by sprinkling, as this will keep the plants free of dust and add to their beauty. Those who are fond of such things may not only hide the fire-place, but derive much pleasure from the care of such a fernery.

Household Notes and Queries.

Moths.—Recollect that it is the larvæ—the caterpillars—that do the mischief. These can only come from eggs laid among the clothes, furs, etc., by the winged moth. This moth begins to fly this month, and keeps around pretty much all summer. Put up the articles in something so tight that the winged moth can not get in, and they are safe. The moth is small and can get through a narrow crack, a nail-hole, or other small opening. The case, or box, or wrapping must be *tight*. If a box is used, carefully paper every joint—that is, not entirely closed. *Articles can be so closely wrapped in paper that they will be safe.* If the paper covering, box, case, cask, or whatever, is thoroughly *moth-proof*, no preventive is needed. If in doubt about the security, camphor or other strong-smelling thing may be used.

Cleaning Paint.—Paint is sometimes cleaned with wonderful thoroughness—indeed, mostly cleaned off. After a course of soft soap and sand vigorously applied, the paint—what there is left of it—looks very clean. Sand should *never* be used, and some of the soaps sold for scouring which contain either very fine sand or powdered pumice-stone, are about as bad. Successive applications of strong soap greatly injure the paint, and should be rarely used. Fine whiting—to be had at the paint or drug stores, is the best scouring material. Use a flannel dipped in warm water, squeezed nearly dry; dip this in the whiting, and rub the paint with it; then wash off with warm water.

Kalsomine is merely Paris White, put on with a glue-size to prevent its rubbing off. The usual proportions are: a quarter of a pound of glue to six pounds of Paris White. Soak the glue in a quart of cold water until soft, put the vessel containing it in a pan of water, set on the stove, and the glue will soon dissolve. Put the Paris White into a pail, pour on boiling water gradually, and stir thoroughly to remove all lumps; use water enough to make the mixture of the right consistence to apply; then add the glue water, and stir again. The right thickness can be told by trial; if too thick it will not apply evenly. Use a new whitewash brush with long hairs—one that has not been used for lime wash. Stir the kalsomine frequently while using. Do not take up too much upon the brush, and apply evenly. The wall or ceiling will appear in all kinds of streaks until dry. A little practice will make it easy; the trouble with beginners is in having the wash too thick.

Borax and Cockroaches.—Several months ago it was stated that we had tried powdered borax, to drive away or destroy cockroaches without success and had found relief only by the use of "Persian Insect Powder." A lady in Quincy, Mass., kindly gives her experience, which was so different from ours, that we are inclined to think that we were not sufficiently thorough or properly patient. She persevered with the borax and exterminated the insects from her bureau-drawers, and elsewhere, by simply sprinkling the powder along the cracks, etc.

Whitening Piano Keys.—"E. S.," Clinton, O. An English work of recipes, that we have found generally trustworthy, says: ivory fixed in place like that on piano keys can not be subjected to the usual processes for bleaching it, and that the best that can be done is to rub the keys with finely powdered pumice-stone on a damp cloth, and afterwards expose them for some time to direct sun-light.

BOYS & GIRLS' COLUMNS.

The Doctor's Talks.

Having in the last two months given a number of illustrations of what is meant by the "Center of Gravity," and shown how necessary it is for us to observe the laws that govern it, it is time to say something about *Gravity*. Had I thought of taking up this subject, I should have begun farther back, and first described some other things about matter. Now I shall have to answer the question that will occur to all of you—"What is matter?"—It is the general name for whatever occupies space—without regard to its *kind*, everything that we can test by our senses, everything that has length, breadth, and thickness, comes under this general term. A *body* is any separate portion of matter whether large or small. Matter has several properties, or qualities, belonging to all its forms. For example, one of these is *magnitude;* we can not imagine any portion of matter so small that it does not occupy some space, does not have surfaces. Another property of matter is called by the rather long name, *impenetrability*, which means that two bodies can not occupy the same space at the same time. There are several other properties of matter, some of which can be

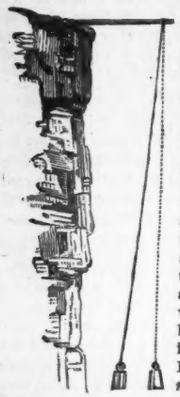


Fig. 1.—GRAVITY.

Fig. 2.—BOX OF BALLS OF DIFFERENT KINDS.

shown by interesting experiments, which I hope to tell you about at another time, but now we must stick to our gravity. We know that matter changes its form and its place—it is acted upon by several *forces*. One of these

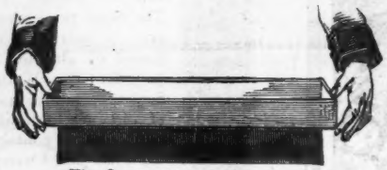


Fig. 3.—BOTTOM OF BOX OPEN.

forces is called the *Attraction of Gravitation*. Every body—every particle of matter attracts every other particle of matter. The force of this attraction is proportionate to the mass. As the earth is the largest body, all substances

Fig. 4.—THE BALLS.

are attracted towards that, and we see this attraction most frequently in bodies falling to the earth. If we place some pieces of cork, or chips, in the center of a basin of water, they will in time be attracted to one another, and to the edge of the basin. If a large mass of lead and a small one be hung by strings, it has been found by very careful measurements, that the large mass attracts the small one—that is, the small piece will be drawn towards the larger one. The force which does this is the Attraction of Gravitation. This has been shown also by an experiment at the Shehallion rocks, Scotland, where there is a very high precipice. A weight was suspended by a cord as in fig. 1, and by observing it from a distance with a telescope it was found that the line did not hang perpendicularly, but the weight was attracted towards the rocks. The attraction of gravitation then is common to all bodies, but it acts with a force proportioned to the quantity of matter in each. The earth, presenting the greatest quantity of matter, its attraction overcomes that of bodies for one another, otherwise things upon the surface of the earth would be in strange confusion. You have, no doubt, heard the story that Newton discovered the force of gravitation by seeing an apple fall from a tree; this, like many other good old stories, has been denied, but the fact remains the same. The apple, when its hold upon the tree was broken, was attracted to the earth. This force is acting constantly upon all bodies near the earth's surface. If you hold a stone in your hand the earth is constantly attracting it, and the force you exercise in keeping the stone from falling, tells you the amount of this attraction, or, as we say, is its *weight*. All bodies are attracted equally by the earth, and all fall with equal rapidity. One of the experiments for showing this is given in figure 2; a box with a loose bottom contains balls of wood, cork, iron, lead, etc.; when the fingers that have held the bottom of the box closed are moved to allow it to fall, as in fig. 3, all these different substances fall with equal velocity (fig. 4), and will strike the ground at precisely the same time. It makes no difference as to the time of falling whether the body be large or small. If we let a dozen bullets fall, they will reach the ground altogether; if the bullets are melted together to form one large one, it will fall in the same time that the single small ones do. The slowness with which some bodies fall seems to contradict the statement that all are attracted alike. For example, a sheet of gold-leaf or a feather falls very slowly. This is owing to the resistance of the air, as may be shown by causing them to fall in a vessel from which the air has been removed, as in what is known as the "guinea and feather experiment." It is not an experiment that you can readily make, but as I have performed it a great many times, I can tell you how it is done. There is required a glass cylinder, some four or five feet tall; this stands upon an air-pump, by means of which the air is pumped out of it. At the top of the cylinder, which is shown in fig. 5, are two little stages, which are held in a horizontal position by a button on the lower end of the central rod. On one of these stages is placed a coin, and on the other a feather; by turning the rod, the stages both drop at once—they are shown in the engraving as down—when the coin and feather will fall at the same time; not having the air to interfere with it, the feather will reach the bottom just as soon as the coin.

Fig. 5.—COIN AND FEATHER.

Our Puzzle-Box.

CHARADES.

1. My first is a serpent, my second is anger, my whole grows out of ambition.
2. My first is a pronoun, my second a preposition, my third a pronoun, my fourth an article, and my whole a noted sea.
3. My whole is the nickname of a certain girl who often fastens my first with my second.

METAGRAM.

In a certain title find—1. To squeeze. 2. To tear. 3. To fasten. 4. To walk. 5. To drink.

CROSS WORD.

My first is in bellow but not in roar,
My next is in window but not in door,
My third is in sonnet but not in verse,
My fourth is in servant but not in nurse,
My fifth is in apple but not in plum,
My sixth is in finger but not in thumb,
My seventh is in gloomy but not in sad,
My eighth is in angry but not in mad,
My ninth is in evening but not in day,
My tenth is in merry but not in gay,
My eleventh is in bonnets but not in hoods,
My whole is a wild thing that grows in the woods.

TRANSPOSITION.

(Fill each blank with the same word transposed.)

I saw a man going by with some —— (full of flowers) in his arms; some of the —— were broken, and on one was a large ——. I told him to —— and set them down by the ——.

RIDDLE.

Mary and Alice, two nice girls,
Were very fair to see,
Sisters they were, indeed were twins,
And so they two were *me*.

Into the orchard once they went,
And sought a certain tree,
And searching in the grass around,
They very soon found *me*.

Again, when Uncle John appeared,
I heard my name repeated—
"Let *me*," he said, "prepare that fruit
Before you ladies eat it." AUNT SUE.

BIBLICAL ENIGMA.

I am composed of 35 letters:
My 2, 8, 28, 16, 31, 21, 11, was a man of distinguished valor.
My 5, 10, 20, 13, 19, 1, 34, were an ancient people.
My 7, 15, 4, 31, 14, 6, 22, was a province of Asia Minor.
My 11, 33, 20, 22, 16, 26, 32, is a range of mountains in Palestine.
My 14, 10, 30, 29, 3, 22, 18, was a woman of eminent wisdom and holiness.
My 20, 10, 17, 28, 22, 32, 25, was a village of Palestine.
My 27, 13, 29, 35, 24, was something that JOB said was made "by the breath of God."
My 30, 33, 12, 7, 22, 3, 14, is an animal alluded to in Scripture.
My 35, 9, 23, 4, 18, 22, 16, was a city of Persia.
My whole is a Scriptural injunction. ISOLA.

CONCEALED SQUARE WORD.

1. Oh yes, Will, I stamped the letter properly.
2. It will surely rain to-day!
3. The long looked-for vessel has at last arrived.
4. Robert ornamented his straw hat with a feather.

C. E. A.

PI.

Shote how canton peek herit now rectess tough ton of eb strutneed thiw het cetress fo hersot.

No. 467. A Puzzle Picture—the artist calls it, though we don't exactly see where the puzzle is. It is certainly a very droll picture, and the more you look at it, the more you don't know who is who, or which is which.

ANAGRAMS.

1. Mitt, a Sachem. 2. Laughs not. 3. Accost true men. 4. Try a thin plum. 5. Find no gruel. 6. Fiction, Lady Nel. 7. Entice gallery. 8. So pour music. 9. O see sober rig! 10. In sad cool set.

ENIGMATICAL STORY.

19, 6, 5, and 11, 3, 15 were two 12, 13, 10, 15 little boys, when they 2, 20, 17, 21, 15 that they could spend the Fourth of July at "Uncle Charlie's." They saw the soldiers with their 16, 10, 18, 11, 14, 7, 8—saw the fireworks, and 4, 9, 14, 18, 1 a most delightful day. As they went home they sang my whole (composed of 21 letters).

PUZZLE.

People all desire to have me,
Lads and lasses, grave and gay—
Everybody seeks and courts me,
No one wishes me away:
Tell me what my name and size—
You see me here before your eyes. A. S.

ALPHABETICAL ARITHMETIC.

DOIM)EOMRUSM(DRCO

DOIM

URMU

TIMT

TSDS

IMRC

ROCM

CTUE

CRD A. F. CONANT.

BIBLICAL DOUBLE ACROSTIC.

1. A king of Israel.
2. A figurative sentence, or discourse.
3. A plant of the grass family.
4. A nephew of David.
5. A Samaritan prophet.

Primals and finals name two women of the Bible.

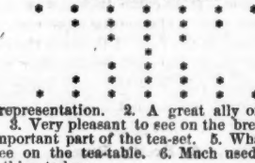
ISOLA.

CHARADE.

My first is a preposition; my second is a French preposition; my third is a weapon and friend; my fourth is an impression; and my whole is a desirable state.

LOUISE.

HOUR-GLASS PUZZLE.



1. A representation. 2. A great ally of the housekeeper. 3. Very pleasant to see on the breakfast table. 4. An important part of the tea-set. 5. What you sometimes see on the tea-table. 6. Much used in jewelry. 7. Something to love.

The central letters, read downwards, name something we dread for ourselves, and should dread for others.

ANSWERS TO PUZZLES IN THE MARCH NUMBER.

PI.—The California Constitutional Convention has adopted a section providing that three-fourths of a jury may render a verdict in all cases except felony.

ILLUSTRATED REBUS.

This is a very good world to live in,
To lend, to spend, to buy, to give in,
But to beg, to borrow, to get a man's own
'Tis the worst world that ever was known

CONCEALED VERBS.—1. Rid. ride, beg, go, do. 2. Swell. prop, run, stand, standing, go, act. 3. Play, lay. say, go, do, 4. Fly, dying, sing, singe, do, put, utter, is. 5. Read, grin, fee. la trace, race, ate. go be.

DOUBLE ACROSTIC.

Iliad—Homer.

I— ne —H
L— —O
I—conis—M
A—uster—E
D— octo —R

GEOGRAPHICAL PUZZLE.—1 Henry. 2 Melville. 3. Fox. 4. Horn. 5. Sleeping bear. 6. Superior. 7. Rainy.

ALPHABETICAL ARITHMETIC.—(*Key*—Only a tiger.) 1064)5205739(4892.

ANAGRAMS.—1. Irrigation. 2. Mathematics. 3. Wearisome. 4 Advocates. 5. Martyrdom. 6. Contrivances 7. Dauntless. 8. Undesirable. 9 Departure. 10. Governess.

DROP-LETTER PUZZLE.—1. Caravansary. 2. Grimalkin. 3 Denunciatory. 4. Apocryphal. 5. Empyrean. 6. Wintergreen. 7. Predaceous. 8. Pragmatical.

SQUARE WORD.

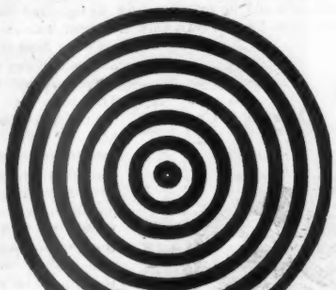
A Z O V
Z O N E
O N U S
V E S T

NUMERICAL ENIGMAS.—1. Patrick Henry. 2 Periwinkle. 3. Love one another.

CROSS WORD.—Affliction.

Can a Thing Move and Remain Still?

"Can I believe my own eyes?"—is a common expression with persons when surprised. In many cases, it is safe to reply to this question—"you can't." In former volumes, we have given several curious illustrations of the fact that "things are not what they seem," by showing you what are called optical illusions. Not long ago, we showed how a collection of perfectly circular black spots would look six-sided, in spite of all you could do. We have shown how two lines, exactly parallel, may be made to appear spread apart at one end, by simply drawing other lines across them. We have given two curved figures, one above another, which you were sure were very unlike in size, until they were measured, or when one was put over the other it was seen that they were exactly the same to the breadth of a hair. To make something appear in motion that you know to be perfectly still, is an easy matter. Draw upon a card a series of black circles, one within another, with spaces or circles of white, of the same width between them, to form a sort of black and white target. Now move the card in a circle—you will soon get "the hang" of it—just move it, face towards the eye, as if you were trying to run the central dot around in a circle about six inches across. When you get the right motion, and it need not be very rapid, the whole target will appear as if it were revolving on its center, and you will also see a sort of dim, hazy cross, that seems to be going in the same direction. The effect is most curious and striking, for there is the thing going round and round as plainly as a cart wheel goes round, yet you know that it doesn't budge a particle. It is better to draw the circles upon a piece of card, or of stiff paper, neatly inking every other one to make it as black as possible, but it will be all the better if you can paint them with India ink. It will show very fairly



AN OPTICAL ILLUSION.

by using this target as printed here—fold the paper back, then crosswise, so as to show the bottom half of this page, and move it as directed. "Why is this so?"—will, of course, be asked. It is not so easily explained. If we say it is a confusion of the impressions made upon the eye by parts of the circles "coincident with the path of the card," you will have what the philosophers say, but not any clearer idea than before. The better way will be, as it can not be explained so that every one will understand it, to call it a very curious optical illusion, and amuse yourself and others with its strange motion—or rather what appears to be motion.

The Doctor's Correspondence.

Another letter from James F. W., and very welcome it is. James is not a "jug-handle correspondent." You will at once wish to know what kind of a correspondent that may be. When you consider that the handle of a jug is "all on one side," you will infer that James is one who gives as well as asks. In answer to his inquiry, I told him last month something about "setting up" large butterflies and moths, and in return he gives his method, and other things that will interest those who are studying insects, or making collections. Concerning

SPECIMENS OF BUTTERFLIES AND MOTHS,

James writes: "Dear Doctor—I was much obliged to you for your hints on raising butterflies. Would you think me impertinent if I suggested an improvement to your method of pinning their wings to a board? I take a piece of shingle, gouge a groove up through the center of it (as you describe in fig. 5, page 149, of the March number). I cut two little slits in the edges of the shingle (as herewith shown in fig. 1), and draw the end of a long piece of thread through one of them. I pin my butterfly (as shown in your fig. 5 and my fig. 1), and then fasten the wings into the required position, adjusting them carefully with a pin, by winding the thread over and over the wings and shingle, and fastening the last end of the thread in the second slit. When the wings are "set," and I remove the butterfly from the wood in the course

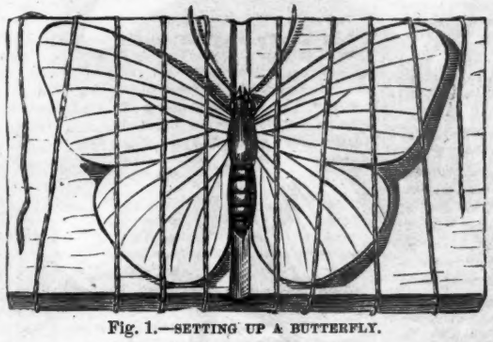


Fig. 1.—SETTING UP A BUTTERFLY.

of a few days, I wind the thread around my shingle, and it is always ready for my next specimen. Shall I tell you how I made my net? [Of course.] I cut from a tree a long stick having two equal, slender, widely-spread branches at the end—a stick shaped like a very long letter Y. Then I fastened the ends together, as in fig. 2. A square of mosquito netting or coarse lace answered for the net. I fastened the edges of this together like a 'jelly bag;' cut off some of the point, then sewed it around the bow part of my stick, and my net (fig. 3) was complete. When I catch my butterfly under the net, I endeavor to get hold of it very carefully *through* the net, and so prevent its fluttering and destroying its plumage; then I take my little bottle of ether out of my coat pocket, remove the cork with my teeth, put one drop of ether on the butterfly's 'nose,' and straightway it becomes a 'specimen.' I am much obliged to you for the suggestion about the Cyanide of Potassium. (I'll be very careful with it, will label it 'POISON!' and put it out of the reach of children and others.) I wish I had known about it before I caught a huge beetle, summer before last. Why I killed that thing seven times!—or thought I did. I gave him ether, camphor, hartshorn, drowned him, smoked him, until I felt sure that if Mr. Bergh knew about it, he would have me arrested for cruelty to animals, but what could I do? I *thought* he was dead every time, and when he would lift up his head and begin to stretch himself, I would say, 'Oh, you poor beast, what am I to do with you!'—I put him under a tumbler with some cockroach powder one day, and in the evening he was 'stretched.' 'At last!' said I, and I pinned him to my wall (which was a simple wooden partition), and went to bed thankful that the poor thing was dead at last. In the middle of the night I woke, hearing some peculiar sound, a sort of regular scratching; got up, struck a light, and if there wasn't my beetle alive once more, dancing around that pin, on the wheel principle, as though he rather enjoyed the exercise. Now, if I had only known about the Cyanide of Potassium, I need not have so prolonged his discomfort and my own. I have been told that it is necessary to sprinkle my chrysalides with water occasionally, as they are expected to be left out in the rain. With thanks, JAMES F. W."

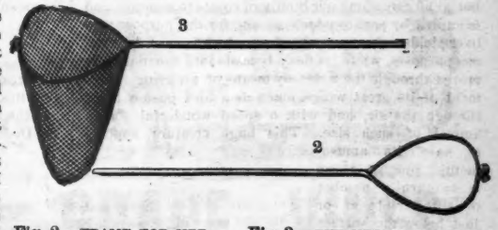


Fig. 2.—FRAME FOR NET. Fig. 3.—THE NET COMPLETED.

HOW TO MANAGE BEETLES.

The best and quickest way with beetles, large and small, as well as the true "bugs" and some others, is to drown them in alcohol. Keep a wide-mouthed bottle—or, better, two, one for the minute specimens. As soon as caught, pop the beetle into the alcohol, and it is soon beyond all such revival as James describes. The insects may be left in the alcohol for months if need be, or until ready to set them up....Miss Maggie wishes to know

"ABOUT ARTIFICIAL CORAL,

and what it is made of." The real coral, as she no doubt knows, is the product of a sea animal, often incorrectly described as an "insect," and there has been much fine writing about the industry of the minute "Coral Insect" that in time builds up islands through its constant and united labors. There is a "coral-animal," but it is no more an insect than it is a fish. It is a *polyp*, one of those strange compound animals with a manner of life more like that of a plant than of other animals. But I cannot now tell you more about real coral other than to say that it is not *built*. It grows, so to speak, and the animal can no more help or prevent it than you can the growth of your bones. Indeed the coral itself serves the creature the same purpose that bones do other animals—it strengthens and protects it. Most corals are quite coarse, but the red coral is very fine in texture, takes a high polish, and is of such beautiful color and comes in such irregular and quaint forms that it is valued for ornamental work. Imitation coral is a substance called

CELLULOID,

an article of recent invention and manufacture. The name means something resembling *cellulose*, and that—*cellulose*—is the material of which the minute cells of plants is made. One of the purest forms of cellulose, in the natural condition, is cotton; the fibres of linen are also nearly pure cellulose, and wood of all kinds consists largely of it. You perhaps know that cotton (and other forms of cellulose) may be so treated with acids, that while continuing to look like cotton it becomes very explosive (*gun cotton*), and will dissolve in ether, which common cotton will not. This solution of gun cotton in ether (*collodion*), is used for various purposes as a varnish. It dries and leaves a transparent coating or film, which, while it is not at all like cotton in appearance, is nearly the same substance. This example shows you how cellulose, in the form of cotton may be changed. In making *celluloid* some form of cellulose is dissolved, and so treated in the manufacture that it becomes a mass which may be moulded into a vast number of useful forms, and when dry has

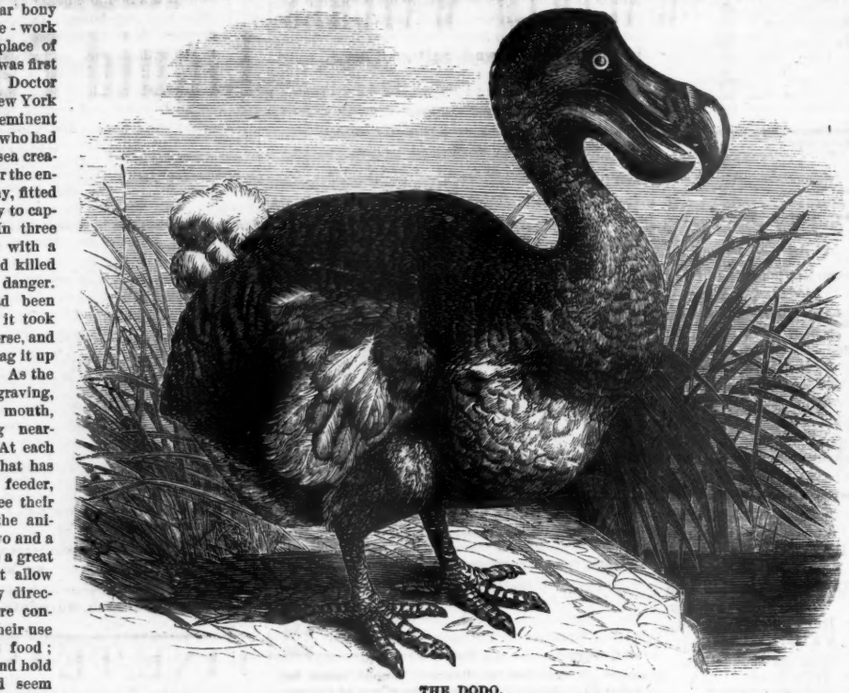
EVERY APPEARANCE OF IVORY,

being white, hard, and taking a fine polish. Celluloid has an advantage over ivory, as having no *grain* it can not crack in any particular direction. Various articles, such as were formerly made from ivory, hard woods, etc., are now made of celluloid. After adding the proper coloring material, celluloid is moulded into the proper shape to form artificial coral, superior to the original in being more durable, and equal to it in every respect save one—it can be furnished more cheaply...."T. Z. S."—Your question requires more research than I can now give it. It is one of those things that may improve by keeping.

The American Devil-Fish.

When we speak of the "American Devil-Fish," you naturally suppose that there are other Devil-fishes that are not American, and we may also add that there are Devil-fishes that are not fishes. There are several large creatures of the sea to which the not very elegant name of Devil-fish has been given. One of these, having been an important character in a generally read work of fiction, is widely known, but is not a *fish*. The Devil-fish of which Victor Hugo tells an exciting story is a *Cephalopod*. If you will turn to page 107 in March last, you will find that the class of animals called *Cephalopods* is briefly described in telling AUNT SUE about her "*Squid*." It is there stated that the Devil-fish of the story is very much like an enormous "Squid," with arms 30 or more feet in length, instead of half as many inches. This is all we need to say about that Devil-fish which is not a fish. Some true fishes, creatures with a regular back-bone, are called Devil-fish, and one is so much larger than the others that it seems to have a right to the name. The picture on the next page shows this fish as it lies upon its back. Its form at once suggests that of the Bat, and we do not wonder that the name of "Sea Vampire" (*Vampire* being the name of a large kind of bat) has been sometimes given to it. But what a huge bat—as you can see by comparing its size with that of the negro pulling at one of the wings! Several have been taken that measured 14 to 16 feet from tip to tip of the wings, and about 12 feet from the top of the head to the end of the tail. A fish of such size as this may be truly called a monster. But you will notice that there is very little about this creature that

reminds you of ordinary fishes; boys who live near the sea-coast will at once say, "It looks like an enormous *Stingeree*," if they have not been taught to say "Sting-Ray"—and in fact it does belong to that division of fishes which includes the Rays and the Sharks, which differ from common fishes in many points, but especially in not having a regular bony skeleton, their frame-work being of cartilage in place of bones. Our Devil-fish was first described in 1833, by Doctor Samuel L. Mitchill, a New York physician who was an eminent naturalist. Some men, who had heard that enormous sea creatures had been seen near the entrance of Delaware Bay, fitted out a boat to go and try to capture some of them. In three weeks they came back with a monster which they had killed after much labor and danger. When the animal had been brought to the shore, it took three yoke of oxen, a horse, and the help of 22 men to drag it up the beach to dry land! As the animal lies in the engraving, you can not see its mouth, which is an opening nearly three feet across. At each side of the mouth is what has been called an arm, a feeder, or a feeler; you can see their ends at the head of the animal. They are about two and a half feet long, and have a great number of joints that allow them to move in every direction. These feelers are constantly in motion; by their use the animal catches its food; they can twist around and hold fast to substances, and seem to be about as useful to this water monster as is the trunk to the elephant. The upper surface of the Devil-fish is nearly black, and it is lighter, even whitish, under the belly. The animal is not at all rare along our Southern coasts in summer, and is hunted by parties which go out for the purpose; its liver yields a great amount of oil, which is used for various purposes, while its flesh is made into a manure. It moves through the water by means of a waving movement of its great wings, much as a bird pushes itself through the air, and with a speed wonderful for an animal of such size. This huge creature appears to have its amusements: one of these is to turn a number of summersets at or just below the surface of the water; the other is to stick a portion of one of its immense wings above the water, and wave it back and forth with a rapid and graceful motion. These two habits enable those who hunt the creature to discover where it is; its presence is sometimes, however, discovered in an unpleasant manner by those who do not see the creature itself. It is able to seize very large things by its feelers, and when it once takes hold of a thing it is very slow to let go. Many years ago the loud cries and screams of "murder" were heard in the harbor of Charleston, S. C.; these came from a negro fisherman, who found his fishing-boat and himself going out towards the sea at a most rapid rate; a Devil-fish had picked up the stone used for an anchor, and was going off with it at a quick pace; the poor fellow was rescued before the bar was reached. Another case is told of a planter, with a large boat and eight oarsmen, who anchored for the night in a creek on the Georgia coast; in the night the planter awoke to find his boat rushing through the water, and he at once cut the rope that held the anchor; when daylight came the boat was found to be many miles from the place where it was anchored the night before, and though in this case the Devil-fish was not seen, there is no doubt that it was the cause of the change. Various other accounts are given of the acts of this fish in running off with boats of various sizes by stealing their anchors. The engraving is from a sketch made by a gentleman in South Carolina who several years ago assisted in taking the fish, which is shown lying upon its back, with the harpoon used in catching it still remaining in the body.



THE DODO.

THE CAPTURE OF THE AMERICAN DEVIL-FISH.

The Dodo.

Our youngsters just now seem to have a taste for antiquities. One boy wishes to be told about the Pyramids and the Sphinx, while another would learn something of the Dodo. As between the very ancient human structures, and a very ancient natural production, we this time choose the latter, and leave the pyramids, etc., for another time, while we tell the very little that is known about the bird—the Dodo. This bird has special interest for naturalists; a great many animals, including birds, are known to have once lived, as their bones are found in excellent preservation. These animals are mostly quite unlike any now living, but although we have no record of them by some one who saw them many years ago, yet we are just as sure that these strange animals once lived as if we had the records—indeed even more so—for here are the bones, witnesses that cannot be mistaken, to tell us that such creatures, though now quite extinct, once roamed over the earth or in the waters. The Dodo, then, is especially interesting, because, while now found no more, it being as extinct as those creatures referred to, has been seen, described, and drawn while alive. The Dodo was formerly found in Mauritius, and probably some of the neighboring islands; it was first discovered by the early Portuguese voyagers, in 1497, and was mentioned by various writers up to as late as 1697. When the island was first visited, the birds were found in the greatest abundance, and the sailors feasted upon the flesh, which is said to have been excellent. The formation of a colony by the Dutch, in 1644, was the beginning of the end of the Dodo; what with dogs and other animals to destroy the eggs and nestlings, and the colonists who killed the older birds, it rapidly disappeared, and has not been known alive since 1715. Live birds were sent to England and other parts of Europe, and a stuffed specimen was known as late as 1755, when being in bad order, it was destroyed, all but the head and a foot, which some one saved from the flames, probably little thinking that in doing this he preserved the most valuable evidence of the existence of the bird. Besides this head and foot, there are another foot, a skull, and some leg and other bones in various European museums, and about six pictures by different persons, supposed to be taken from life. You will like to know how this bird—which from being abundant has so completely disappeared, that not even a skeleton remains—looked when alive; the engraving, from one of the paintings, will show you. One writer described it as a "gosling enlarged to the dimensions of a swan." Its short, scaly legs were of little use for running, while its very small wings, with a few feathers, could be of no use for flying; and the bird must have lived a lazy, quiet life, with little ability to get away from its enemies when they finally came to the island. The large bill, with the upper one strongly hooked, the clumsy toes, the tuft of curious curly feathers that answered for a tail, are plainly shown; when we add that the general color was greyish, with some black feathers, you will know all that is possible to learn as to the appearance of the bird. Some naturalists have placed the Dodo with the ostrich and its relations, but the present opinion is, that it was an enormous pigeon, and that its great hooked bill that looks so savage was merely for tearing open cocoanuts and other tropical fruits that fell from the trees, as the clumsy creature could neither climb nor fly to reach them. If a pair of live Dodoes could now be discovered, what an excitement they would make among our pigeon-fanciers, though perhaps not as "carriers."

That "Curious Question."—A person going round the earth eastwardly will gain a day; those going around westwardly will lose a day. When they meet at the starting point, the former will have seen two days more than the other, and by making ten such trips, he will have gained twenty days. See last month, page 149.

Strongest, Cleanest, Purest!

Dairymen sensibly receive with full credibility, the opinion of so competent and candid an expert as A. W. Cheever, editor of the *New England Farmer*, when he says of the Perfected Butter Color, made by Wells, Richardson & Co., Burlington, Vt "We have used it for several years, and have found nothing equalling it, although we have tested about everything of the kind made in this or the old country. It is the strongest, cleanest, purest and cheapest butter coloring we have ever found and for all we can see, it is absolutely perfect." H. Booker, Whitewater, Wis., says: "It gives a good color without any trouble." Henry Copeland, of Hampton, Ct., says: "Several that have seen butter colored with it say it looks and tastes as well as June butter." It increases the market value of butter, at least four cents per pound.

Breeders of Fine Dairy Stock

Should at once investigate the **Perfect Creamer** advertised in another column. It will enable them to realize the largest possible yield per cow, and thus enhance the value of their stock, as well as increase *the value* of the product.

Gigantic Offers.

Your attention is called to the mammoth new advertisement of Mr. Daniel F. Beatty, of Washington, New Jersey, in this month's paper. Mr. Beatty's celebrated Pianos and Organs are so well known throughout the civilized world that they require no word of commendation. Lowest prices, superior workmanship and complete satisfaction have brought this house prominently forward until to-day he stands the only man in his trade who dares to ship his instruments on test trial, and if unsatisfactory refunds not only the price, but all freight paid. No fairer offer can ever be made or even suggested His sales now amount annually to several millions of dollars, and when it is taken into consideration that a few years ago he was only a poor plow-boy, it must be evident to every reader, that Mr. Beatty is the possessor of rare talent in his vocation. A saving of 5 per cent can be made when two instruments are ordered at the same time, therefore talk over among your friends and neighbors these unparalleled offers on the celebrated Beatty Pianos and Organs, and try to secure for yourselves this special discount.

THE

Only Sensible Shoe for Children

Are those with the SILVER or

THE A.S.T.Co BLACK TIP UPON THEM.

THEY REDUCE SHOE BILLS ONE-HALF.

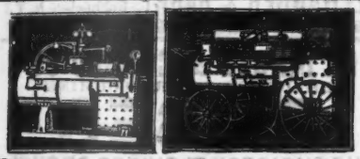
ASK YOUR WATCHMAKER FOR

A KEY THAT WILL WIND ANY WATCH

AND NOT WEAR OUT.

By mail 30c.—**AUTOMATIC** Eye Glass Holder, by mail 25c.—**Birch's Pat. Key Ring**, 10c.—Circulars free.

J. S. BIRCH & CO., 38 Dey St., N. Y.



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FOR 1878 AND 1879.

More effective and more complete, and more readily adapted to the various mechanical and agricultural uses than any other in the market. Practical improvements accumulated from twenty years' manufacturing experience, with reputation maintained and success established.

Send for Circulars, descriptive, and containing testimonials concerning our **PORTABLE STATIONARY and AGRICULTURAL STEAM-ENGINES.**

WOOD, TABER & MORSE,

Eaton, Madison Co., N. Y.

HOWARD & CO., New York.

Special Announcement in Relation to

WALTHAM WATCHES

In Solid Gold and Silver Cases.

No Nickel Cases.
No German Silver or Albata Cases,
No Plated or Stiffened Cases,
No Filled or Low Grade Gold Cases
have ever been sold by us.

We have sold more Waltham Watches than any house in the country, and every single one in a Solid Gold or Silver Case.

Note the Latest Reduced Prices:

No. 8, Key-Winder,		$ 9 90	former price,	$13
" 8, "	"	$12 70	" "	$18
" 7, "	"	$16 90	" "	$20
" 8, "	"	$21 80	" "	$25
" 10, "	"	$29 90	" "	$33
No. 8, Stem-Winder,		$13 70	former price,	$18
" 3, "	"	$16 60	" "	$24
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Your Winter Grain Fields, Grass Lands, and Pastures. The Stockbridge, applied as a top-dressing during this month and a part of next, on Winter Grain, will give most excellent results. Winter Grain which has suffered from the winter will also be greatly benefited. For top-dressing Grass, the Stockbridge has given universal satisfaction, producing from two to three tons to the acre. Remember it is free from weed seeds, and you can haul, at one two-horse load, enough to go over six or seven acres. It may be applied from now till early May, but those who used it early last season were enabled to cut a heavy crop in early June, and also obtained a good second crop before the August drouth set in.

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Novelties and Other Seeds of Special Merit.

Pearl Millet.—Clean Seed, 15 cts. oz., 40 cts. ¼ lb., $1.00 lb., 4 lbs. $3.50. Seed in chaff, 50 cts. pt., 80 cts. qt., by mail, post-paid. Prices to the trade will be given on application.

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New Early Field Corn—Queen of the Prairie.—The earliest variety of Field Corn in cultivation. It was planted, the last season, after the wheat crop had been harvested, and matured the crop perfectly. It was also planted on Long Island, July 4th, and fully matured the first of October. Selected ears, 25 cts.; 3 lbs., by mail, post-paid, $1; shelled, $1.50 peck; $4 per bushel.

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Chester Co. Mammoth or Golden Dent, the largest, best, and one of the most profitable corns for the main crop. Bush., $3.00; peck, $1.00; select ears, 75 cts. doz.; $5.00 per hundred. By mail, 3 lbs., $1.00—ears 25 cts. each.

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Kenney's Early Amber Sugar Cane.—In this variety we have a plant that is destined to prove of immense value to the northern portions of our country. When planted early in May, the seed almost invariably ripens, thus giving one the advantage of a double crop in one year, from one planting, some 20 or 25 bushels of seed, and 150 or more gallons of fine syrup per acre—900 lbs. sugar were produced from one acre in Minn. All kinds of farm stock are fond of the seed. We have samples of sugar in our office produced from this variety equal to the best coffee sugars in the market. By mail, 60 cents per lb., 3 lbs. $1.50. Prices for larger quantities upon application.

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Per pkt. 15c.; per oz. $1.00; per ¼ lb. $3.00; per lb. $10.00 Sent by mail, postage paid.

The following testimonials are selected to show that the Surprise Musk Melon has been a success in all parts of the country.

Of very superior quality as well as size. COUNTRY GENTLEMAN.

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The earliest known. Kernel large, white, sweet and tender. Ears 8-rowed, thick and plump. Stalk 3 ft. high. Per pkt. 10c.; per pint 30c.; per quart 50c., by mail, postage paid. Per bush. $8.00.

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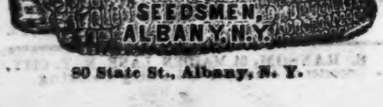

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8 Abutilons, or 4 Azaleas, or 6 Oleanders, or 12 Stevias,
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4 Palms, or 6 Hibiscus, or 12 white-leaved plants,
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18 Verbenas, or 12 Blotched Petunias, or 6 Cannas,
25 varieties of Flower, or 20 varieties of Vegetable Seeds,

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Marblehead Early Sweet Corn.—Decidedly the earliest of all varieties of sweet corn. Per package, 15 cts.

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Bastian's Early Blood Turnip Beet.—The best of the earlies; a great acquisition. Per ounce, 12 cents; per pound, $1.25.

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Butman Squash.—20 cts. per oz.; 10 cts. per package.

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Hubbard Squash.—20 cents per ounce.

As the original introducer of these three splendid winter varieties, I offer seed grown specially for purity.

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For $1	you buy	$1.10	worth of	Seeds or Plants.
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—A K J—

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—P Q—

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Norbiton Giant Long Red,	$0 40	$2 50
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Lane's Imperial Sugar,	$1 00	$4 00
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TURNIP.		
Improved American Ruta Baga,	$0 60	$2 50
Red Top Strap Leaf,	0 60	2 50
Yellow Aberdeen,	0 60	2 50
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" Stone,	0 60	2 50
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Price for seed of this valuable fodder plant, which has yielded with us 100 tons green, or 14 tons dry per acre:
40 cents per pint (by mail, post paid),
$1.00 per quart, " "
or by express, buyer to pay charges, $5 per peck.

Statement of our experiments with it, and cultural instructions, free on application.

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Ask reliable dealers for it.
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CHARLES DICKENS,	WILKIE COLLINS,	WILLIAM BLACK,	GUIZOT,
JACOB ABBOTT,	J. G. WOOD,	MACAULAY,	CHAS. NORDHOFF,
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$1,000 3-String Grand Square Piano for Only $255.00.

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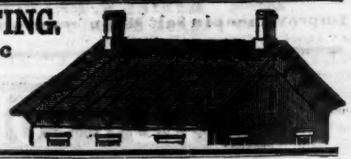

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Our new ten-gauge Single Gun—price (reduced list) $15.50.

J. STEVENS & CO., Chicopee Falls, Mass.

containing a great variety of Items, including many good Hints and Suggestions which we throw into smaller type and condensed form, for want of space elsewhere.

Continued from Page 176.

In justice to the majority of our subscribers, who have been readers for many years, articles and illustrations are seldom repeated, as those who desire information on a particular subject can cheaply obtain one or more of the back numbers containing what is wanted.

Back numbers of the "American Agriculturist," containing articles referred to in the "Basket" or elsewhere, can always be supplied and sent post-paid for 15 cts. each, or $1.50 per volume.

Cover for a Drain.—"G. E. P.," Booth Bay, Me. Spruce timber is not very durable when used to cover drains or culverts. It will last longer if it is flattened and the bark and sap-wood taken off. It will probably last 6 or 8 years if 8 inches thick—that is, 12-inch logs flattened to 8 inches.

Shoe-Polish.—It should have been stated that the medal awarded at the Paris Exposition for shoe-dressing was for the "Satin Polish," long advertised in our columns by B. F. Brown & Co., Boston—and to *no other.*

Remedy for Poison Laurel.—"G. L.," Machias, Me. The usual remedy for poisoning with sheep laurel is to give half a pint of melted lard or sweet oil. This appears to neutralize the poison, and at the same time helps to remove it from the stomach and bowels in a short time. Goats are as easily poisoned by it as sheep.

Light in the Stable.—"C. C.," East Machias, Me. A stable should be well lighted, and the window should be in front of the horses. A long narrow sliding window, placed 5 or 6 feet from the floor, so as to cast the light from above, is best. If hay-shutes and stairways are found too cold, they can easily be closed by trap-doors. Horses enjoy plenty of light. If their eyes are weak, the light may be softened by "dabbing" the glass with a stiff brush held perpendicularly to it and dipped in white paint. This gives the effect of ground glass.

Crop for Wet Mucky Land.—"A. S." Oats is the best crop for moist swamp meadow land. It is also a good crop to sow down such a piece of land with. Sow 2 bushels of oats per acre, and seed down with 4 quarts of timothy and 1 bushel of red-top per acre.

Stretches in Sheep.—"G. H.," Columbia Co., Ohio. Stretches are caused by indigestion. The sheep suffering from colicy pains, stretches itself with its fore and hind legs apart. It is cured by a simple purgative. A handful of salt acts as a purge, and restores the digestion. One ounce of Epsom salts, with a little ginger, will have a more certain effect. Any ruminant when fed upon dry feed and deprived of ample water, or when given water so cold that it cannot drink enough, suffers from indigestion and impaction of the rumen, and this is a frequent cause of disease, costiveness, scours, dysentery and bilious disorders.

Treatment of a Bull Calf.—"N. A. R.," Lyndon, Kansas. A bull calf needs no extraordinary treatment. Sufficient feed to keep him in good growing condition is all that is required. Such feed should now consist of hay and two quarts per day, in two feeds, of ground oats, corn, and wheat or rye bran. He should have occasionally a pint of linseed meal, be kept clean, and well stabled. Some exercise in a yard will be beneficial. He should be kept securely tied, alongside the other stock, and not tied up in a stall out of sight of other animals. Over feeding is injurious.

Bean Weevils.—Mrs. "H. G. H.," Moor's Hill, Ind., writes that beans planted so late in the season, as to mature just before frost will escape the weevil.

Sunstroke in Horses.—"M. B.," Merrill, Iowa. During very hot weather horses should be protected from the sun by a shade over the head and a *white* linen sheet over the body. A wet sponge should be kept on the head. A loose collar should be worn, and the general health kept vigorous. It is not so much the heat upon the head that causes sunstroke as the heating of the entire system. For treatment, cool the system rapidly by dashing cold water over the limbs, applying ice to the head, temples, neck, and legs, and wherever a pulse can be felt.

Cows, as well as horses, were sunstruck the past summer, even in shaded yards and stables, from the heat of the air as well as from its "closeness" or impurity. No alcohol should be given; in your case this may have caused death by the inevitable reaction when the effect of the stimulant ceased. Instead of any alcoholic stimulant injections of 2 or 3 drams of muriate of ammonia dissolved in 4 ounces of water may be given, and the neck and legs rubbed with mustard water (one ounce in a pint of water), giving continued friction with a coarse cloth. As soon as the pupils of the eyes begin to dilate improvement may be looked for. If the skin is very hot and dry, the whole body may be sponged with cold, but not ice-cold, water, and afterwards rubbed gently, but vigorously, with a dry rough cloth.

Very Desirable Homestead, with *City and Country* advantages well combined. A large Dwelling, well furnished if desired; Barn and other out-buildings; large glass grapery; fine garden, fruit, etc.; 3¾ acres; situation high and healthful, with fine scenery. Best society and Educational advantages; 98 miles from New York, with frequent daily communication by railroads and steamers. For sale low, or to rent to a good family on very moderate terms, for 6 to 12 months or longer. Address "Homestead," care *American Agriculturist.*

Romney Marsh Sheep.—"J. L. G.," Merrimac Co., N. H. There are no Romney Marsh Sheep in this country that we know of. It is a breed that would doubtless fill an important place both for wool and mutton, and it would probably be a profitable sheep to import. They can be purchased abroad at very moderate prices, as they are not "fancy stock."

Barn or Granary Weevils.—A correspondent in Pa., asks for the best method of clearing a barn of weevils. If any of our readers have succeeded in doing this, we shall be glad to hear from them. But it is not necessary to send us the old remedy: "Burn the Barn."

How to Treat Mange.—"J. R.," North Topeka Kans. Mange is caused by a very small insect, which burrows in the skin, produces irritation and disease, and destroys the hair follicles. It should be treated by sulphur and lard oil, mixed together by rubbing thoroughly. The mixture should be rubbed into the skin; if there are scabs, these should be soaked in warm water and broken up, when the sulphur ointment should be rubbed in.

Catalogues Received.

SEEDSMEN.

W. E. BOWDITCH, 645 Warren St., Boston, Mass.—Besides all kinds of seeds, offers florists' plants, etc.

W. ATLEE BURPEE & Co., 221 Church St., Philadelphia, Pa.—A supplementary list offering several specialties.

SAMUEL N. COX, Saint Joseph, Mo.—Garden and agricultural seeds in a catalogue of exceeding neatness.

CROSSMAN BROTHERS, Rochester, N. Y.—Large, full, abundantly illustrated and instructive, as usual.

FRANK S. PLATT, New Haven, Conn.—A very full list, showing freshness and originality throughout.

FLORISTS.

N. ADMIRAL, Danville, Ill., is a new comer in the business, and starts with a full stock of new and old plants.

ELLWANGER & BARRY, Rochester, N.Y., issue separate catalogues of their floral departments. We have at hand a list of greenhouse and bedding plants, and a rose catalogue, which is also a treatise on rose culture.

JOSEPH T. PHILLIPS & SON, West Grove, Pa., make a specialty of roses, and offer a general stock.

STORRS, HARRISON & Co., Painesville, Ohio.—In February last we noticed the full nursery catalogue of this firm; they now send an equally full list of florists' stock.

GEORGE SUCH, South Amboy, N. J., besides his remarkable general catalogue, issues each spring a list of plants in demand at that season. The lists of gladioluses, cannas, lilies, etc., are very full and choice.

A. WHITCOMB, Lawrence, Kansas.—Neat, full, and select, are terms which describe this catalogue.

W. B. WOODRUFF, Westfield, N. J.—Last month we said "fruit stock," when it should have been *florists'*.

NURSERYMEN.

Under this head are placed those who deal in small fruits only, as well as general nurserymen.

BUSH & SON & MEISSNER, Bushberg, Jefferson Co., Mo.—Their annual list of grapes is remarkably full and is condensed and classified in the same admirable manner of former years. Also the leading small fruits.

ELLWANGER & BARRY, Rochester, N. Y., issue no less than five distinct catalogues, besides occasional special lists. When these catalogues are bound in one—as in the volume before us, they give one an idea of the immense variety contained in this, one of the leading nurseries of the world.

JOSEPH FRITTS, Macedon, N. Y., makes a specialty of small fruits and sends wholesale list.

C. H. & J. H. HALE, South Glastonbury, Conn.—Small fruits with several specialties; family collections low.

CHARLES HURD should put his place of business on the first page; we have to look to the very end of a full descriptive catalogue of small fruits to ascertain that he is at Manistee, Mich.

THOS. JACKSON, Portland, Me.—Sends his 29th wholesale list, which is specially full in evergreens.

THOMAS MEEHAN, Germantown, Pa., sends his very full wholesale catalogue, with a separate list describing some specially desirable trees and shrubs, and another of small stock that may be sent by mail.

JOHN C. NELTNOR, Turner Junction, Ill.—Exceedingly neat special lists, which give much useful information.

H. M. THOMPSON & SON, St Francis, Wis.—Evergreens and forest-tree seedlings a specialty, with other stock.

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AGRICULTURAL AND OTHER MACHINERY.

ADRIANCE, PLATT & Co., 165 Greenwich St., New York.—When we say that this firm makes the Buckeye Mower, the Adriance Reaper, and the Buckeye Mower and Reaper—it is not necessary to add anything more than that their catalogues are as elegant as their machines are excellent.

W. ATLEE BURPEE & Co., Philadelphia, Pa., offer Corn Huskers and Corn Shellers.

C. AULTMAN & Co., Canton, Ohio.—Besides being the great Western makers of the Buckeye Mower, and Mower and Reaper, which they describe in a beautiful catalogue, they devote a similar pamphlet to the Sweepstakes Thresher, this, with the horse power and steam engine used to run it are amply illustrated.

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LLOYD, SUPPLEE & WALTON, Philadelphia, describe the merits of the Pennsylvania Lawn Mower made and sold by them.

LOOMIS & NYMAN, Tiffin, Ohio, make the Well-boring and Rock-drilling Machine, which they describe in full.

C. C. PHILLIPS, 4,048 Girard Ave., Philadelphia, describes his Vertical French Burr Grinding Mills in a well illustrated pamphlet.

G. WESTINGHOUSE & Co., Schenectady, N. Y., illustrate their well-known Threshers, Clover Hullers, Horse and Steam Powers, etc., in an ample catalogue.

GARDNER B. WEEKS, Syracuse, N. Y., offers in his catalogue everything that can be needed in a dairy, large or small, from a steam engine to a stencil plate.

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Respectfully, etc., H. K. & F. B. THURBER & Co., Importers, New York.

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ATLAS ENGINE WORKS, Indianapolis, Ind.

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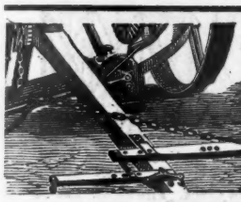

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They are made of perfect stock, and the best workmanship, and are strong, simple, efficient, convenient and durable.

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A NEW AND IMPORTANT INVENTION.

On receiving the retail price ($20), we will send one of these Power Butter-Workers to any responsible party, and *guarantee satisfaction*, or the money will be refunded.

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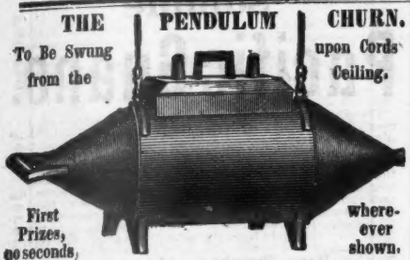

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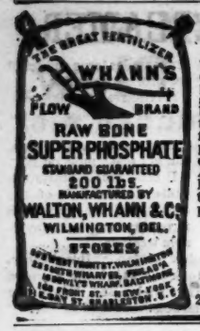

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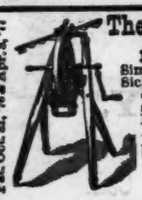

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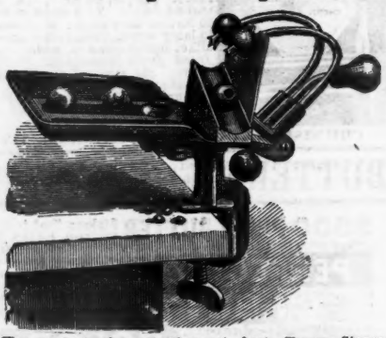

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Union Railway Horse Power.

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This very superior power produces much more power with far

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Shaker Separator,

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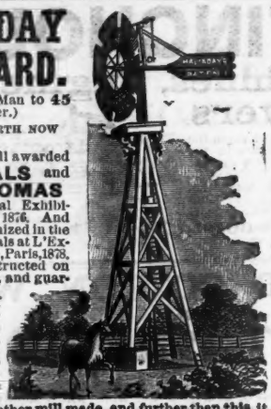

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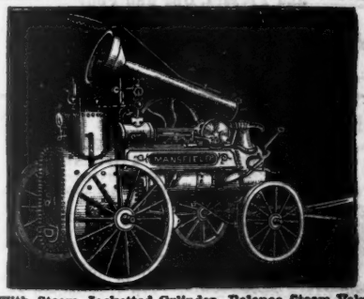

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(*From the New York Evening Post, April 10th.*)

The book is profusely illustrated, and is likely to be accepted as a standard authority by the lovers of dogs and of those sports in which the dog shares.

(*From the New York Tribune, April 11th.*)

Mr. J. H. Walsh (Stonehenge) has treated of most topics relating to the breeding, education, and general management of the dog. He is regarded as the highest living authority on the subject, and his counsels with all sporting men and dog-fanciers have the weight of judicial decisions. The two works on which his reputation chiefly depends are reproduced in this edition in an abridged form, but retaining all the essential features of the original volumes, *and at a great reduction* from the price of the imported works. Such additional matter as was deemed desirable for American readers has been contributed by Mr. David W. Judd, by Mr. Henry Stewart, and by Mr. F. R. Ryer, who is very favorably known as an expert in most of the branches of canine lore. The volume is chiefly of a descriptive character, giving a minute account of the different species, and presenting an *admirable compendium of the natural history of the dog*, but without the hard names and scientific gimcracks of zoological pedants. The practical directions relate mostly to the rearing and treatment of sporting animals. The illustrations of the volume *are uncommonly faithful and spirited*, presenting several attractive specimens of canine nobleness and beauty.

(*From the N. Y. Commercial Advertiser, April 5th.*)

It is the *cheapest and the best book* on dogs ever issued in this country. It is a 12mo., printed on tinted paper, contains over one hundred illustrations of famous dogs, and is presented to the public very handsomely bound. The great cost of good works on dogs has been a bar to their general circulation. Stonehenge sells for $11.25, while the new work which the Orange Judd Company give to the public to-day contains the most important portions of those works, together with chapters of interest to American readers which have been inserted, and may be obtained for $2. The new matter is the production of David W. Judd and Henry Stewart, whose works on animals have a wide circulation, and by "Warwick," of dog lore fame. These gentlemen are peculiarly qualified for the work, and making the use they have of Stonehenge, have produced the most valuable *work on dogs ever printed, and which is sold at a remarkably low price.*

From Turf, Field and Farm, April 4th and 11th.

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From the New York Evening Mail, April 7th.

Stonehenge's works are too costly to be within the reach of modest incomes, and it is a real boon to all lovers of the noble animal to have all the essential portions of the two volumes thus put in one book at a moderate price. All the distinguishing marks of the best breeds are carefully and clearly noted. Five chapters are devoted to the breeding, rearing, treating, and management of the dog, in-doors and out, especially the breaking and rearing of hunting dogs. Seven chapters are allotted to the diseases of dogs and their treatment. The volume is the *most complete and useful treatise on the dog which has appeared in the United States*, and ought to be in the hands of every one who owns even one dog which he prizes.

(*From The New York Evening Express, April 11th.*)

Every species of dog, from the little pet who is fondled in the boudoir or caressed in the parlor, to the stout mastiff who is feared by intruders and beloved by the household, finds a place within the covers of the book. Attractive chapters upon shooting, and upon the use of the dog as the sportsman's companion, are also included. The articles written on this side of the water are able and concise, and the compilation of the volumes should be satisfactory to those who resort to it for pleasant reading, or for information. Stonehenge is a friend to the dog, and so will be the readers of the book if an appreciation of the dog as man's best friend be not already assured.

(*From the Spirit of the Times, New York, April 5th.*)

The higher the degree of civilization the more highly is the dog cherished for its sagacity and affectionate disposition. A book, then, which has for its object to bring the dog into more prominent notice, and to encourage a refining and more kindly disposition on the part of its owners, must always serve a good purpose. This new work on dogs *will attract the notice of every friend of these animals*, and will undoubtedly tend to largely add to the present increasing favor with which they are regarded. The work is a handsome book of nearly 400 pages, profusely illustrated, with new engravings *made expressly for it* by the well known artist and sportsman, Charles Hinkle, Esq., and is *faultless in its typography* and general appearance. It is a reproduction in part of those standard works on the dog, "Stonehenge on the Dog, in Health and Disease," and "The Dogs of the British Islands," together with new and original matter by David W. Judd, Esq., and Mr. Henry Stewart, which makes the work more especially American in its aims, and renders it *more acceptable* to American readers, than would be a mere reproduction of Stonehenge's works with their peculiarly foreign tone and manner. The works of Stonehenge are very costly, and are thus beyond the reach of many willing American purchasers. This new work, however, costs but one-fifth as much as the former, and is thus brought *within the reach of every owner of a dog*, and *every person who owns a dog should* own a copy of *this book.* We cordially commend it to public notice.

(*From the New York Sportsman, April 5th.*)

The minor details of merely local interest are omitted, everything of interest to American readers being reproduced from Stonehenge. The engravings number over one hundred, and embrace sixteen full-page cuts of many of the principal dogs on both Continents. The work is handsomely printed on tinted paper, and *altogether makes a most superb volume.*

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